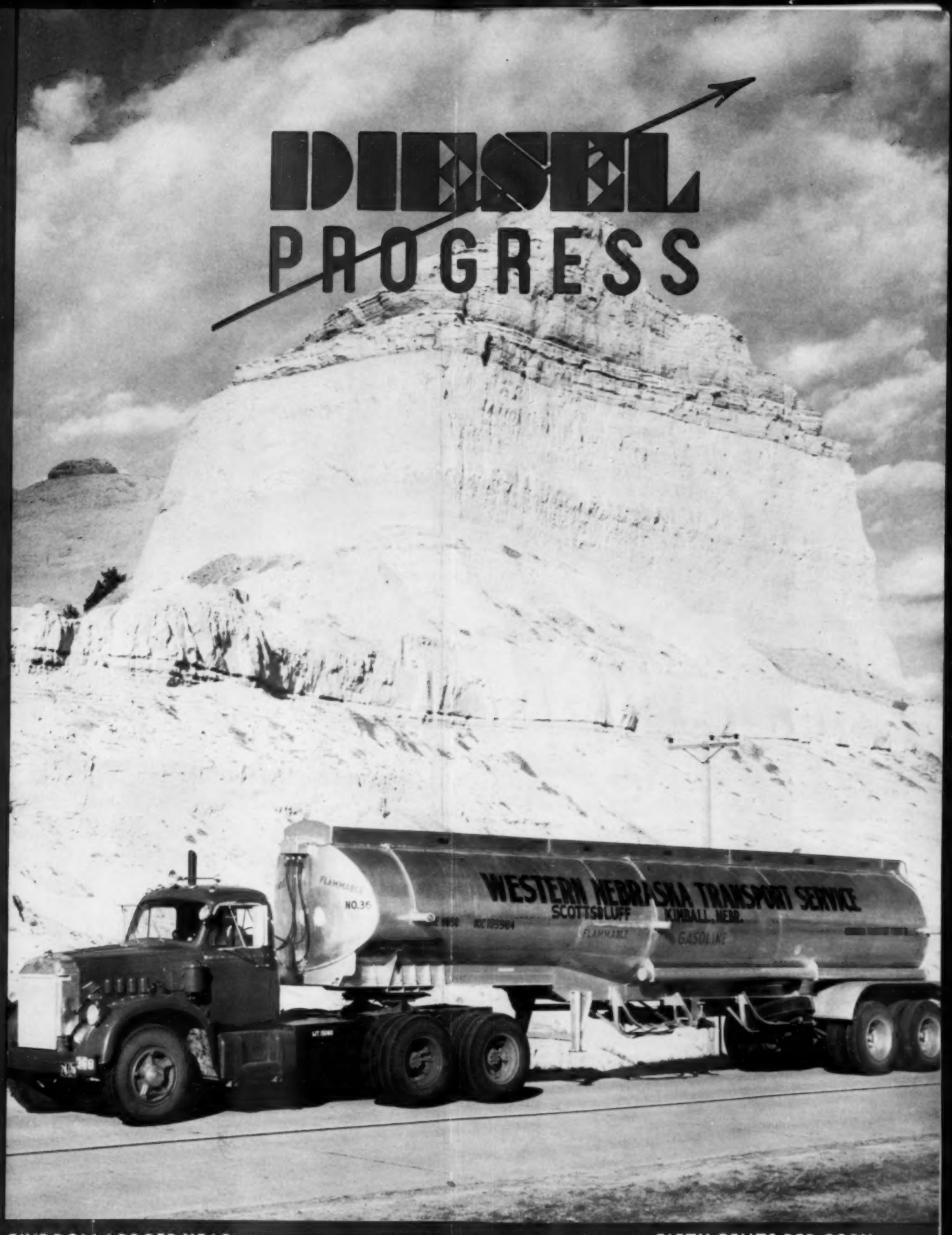
DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



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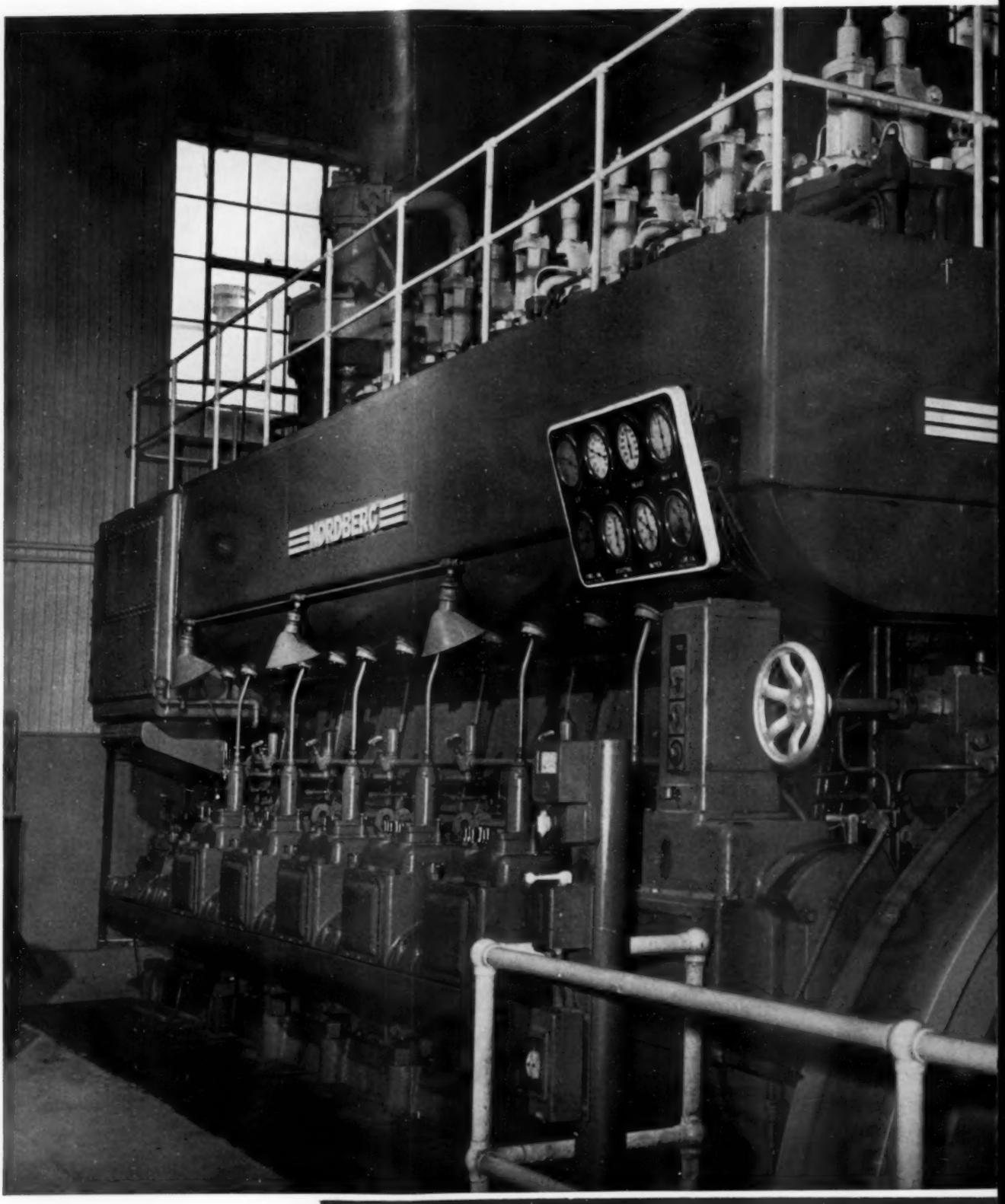

TEXACO

TEXACO
REG. T.M.

Make sure you get the power you pay for

When fuel and maintenance bills get out of hand and power's not up to par, chances are your oil is the culprit. Let your Texaco Lubrication Engineer recommend the proper grade of *Texaco Ursa Oil.*

Texaco Ursa Oils keep diesel systems running clean for full compression and complete combustion . . . prevent harmful deposits in the combustion chamber, in crankcase and on valves. They help minimize ring, cylinder and bearing wear—all of which adds up to full power on less fuel and lower maintenance costs.

For over twenty years more stationary diesel horsepower in the United States has been lubricated with Texaco than with any other brand.

There is a complete line of *Texaco Ursa Oils* to meet the requirements of all diesel, gas and dual-fuel engines.

Just call the nearest of more than 2,000 Texaco Distributing Plants in the 48 States—or write The Texas Company, 135 East 42nd Streeet, New York 17, N. Y.

URSA OILS FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES

3 dependable products for the diesel industry

DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

DE LAVAL HIGH PRESSURE TURBOCHARGERS

De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- *and* 2-cycle engines.

You'll find additional data in these De Laval Bulletins. Write for your copies.

DE LAVAL

Steam Turbine Company

TRENTON 2, NEW JERSEY

DIESEL and GAS TURBINE PROGRESS

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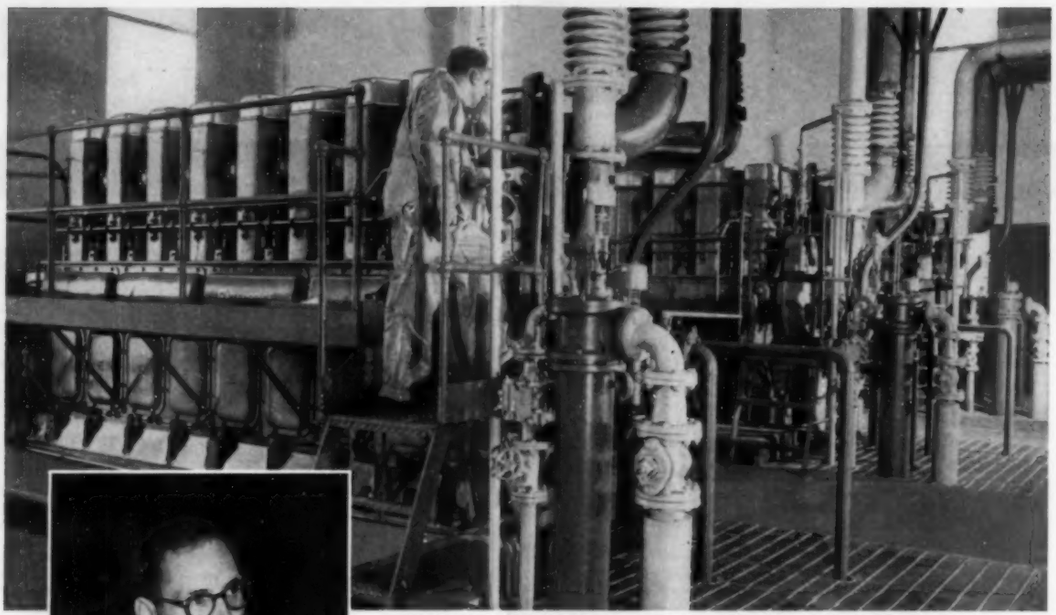
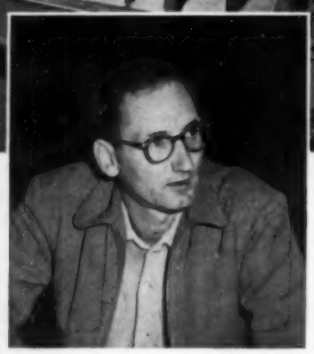
FRONT COVER ILLUSTRATION

One of the twenty-two Diamond T diesel-driven tanker trucks owned by Western Nebraska Transport Service. This truck is powered by a Cummins turbocharged JT-6-B diesel driving through a Fuller five-speed transmission.

Enterprise Engines Run 90% on Free Sewage Gas





Three 625 HP Enterprise Dual Fuel engines at San Jose, Calif. handle the complete power load for all electrical and pumping requirements of this sewage plant.

"Trouble-free and maintenance-free, with very reasonable manpower requirements."

Fred M. Belick

Supt., San Jose, Calif., Sewage Treatment Plant

"We're extremely pleased with the record of efficiency and economy experienced to date with our three Enterprise Engines. They have operated trouble-free and maintenance-free, fitting in exceptionally well with our treatment plant requirements.

"By operating on methane, the sludge gas by-product of sewage treatment, our fuel costs have remained at a minimum. In addition, the Enterprise Dual Fuel 'Select-O-Matic'® feature has given us the flexibility we need when sludge gas production becomes erratic. On either gas or oil the engines respond well to changes in power demands. All in all, these engines provide us the dependable, continuous operation we need with very reasonable manpower requirements."

This and other model sewage plants in such cities as New York, East Boston, Mass., and San Diego, Calif., attest to the fact that complete dependability and economy of municipal operations start with Enterprise Engines.

Engines of Every Type and Size for Every Municipal Need

Enterprise specializes in engines for stationary and portable electric power generation, flood and water pumping systems, and sewage plant power. Versatile fueling is available in diesel, dual fuel and spark ignited gas engines. Models range from 73 to 7703 HP. Call in the Enterprise sales engineer in your area, or contact factory direct for information or help with your plans.

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dependable **ENGINES**

Over a million horsepower at work the world over!

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Giant Redwood loads handled easily with Fuller ROADRANGER® *Transmissions*

Simpson-Redwood Company of Arcata, California, uses Kenworth 802 logging giants equipped with Cummins 335 hp NRTO-6 diesel engines and Fuller 9-speed R-1150 ROADRANGER Transmissions to bring in the big logs.

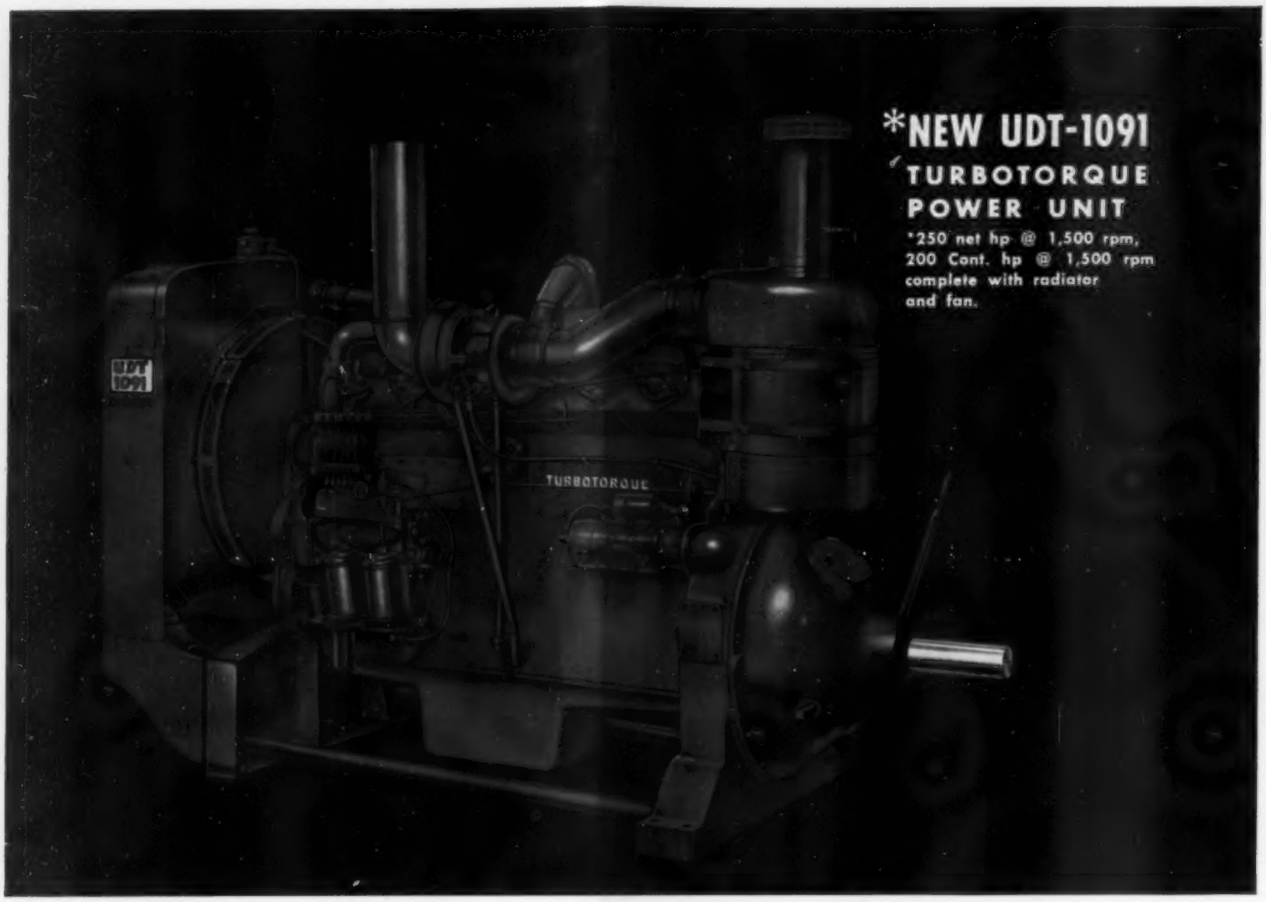
Yet these mammoth trucks handle easily, are highly maneuverable even over private roads where the sharp turns, favorable grades and extreme loads encountered in downhill logging operations demand maximum capacity. The R-1150 ROADRANGER's easier, quicker shifts . . . 38% steps between ratios, with one shift lever controlling all forward and 1 reverse speeds — the 9 selective gear ratios evenly and progressively spaced (no split shifting) . . . make outstanding performance possible on each punishing trip.

To meet successfully the daily challenge of heavy logging operations, put the horsepower in your trucks to work efficiently and economically . . . with Fuller semi-automatic ROADRANGER Transmissions. Check now with your truck dealer for complete information on the model best suited to your work, or write Fuller Manufacturing Company (Transmission Division), Kalamazoo, Michigan.

One of Simpson-Redwood's Kenworth giant trucks on a Klamath, California, logging operation.

FULLER

TRANSMISSIONS



New 250 hp *Turbotorque International . . . power cost-cutter for your big machines

Now—lower cost, more dependable power for your big driven machines—the new 250 hp Turbotorque International UDT-1091 power unit. And that's on-the-job shaft horsepower—not the inflated laboratory variety against which big deductions must be made for fan, radiator, accessories, plus altitude and air temperature.

This instantly available 250 hp, along with an extra-large counterbalanced crankshaft and heavy flywheel, carries you through peak loads that stall lighter weight engines. As a result, you can make full use of the continuous duty 200 hp rating for more production at lower cost.

The UDT-1091 has all the features that have made the 200 hp naturally aspirated UD-1091 a favorite diesel power source. In addition, it has a water-cooled oil temperature stabilizer as regular equipment and a radiator with greatly increased cooling capacity. The efficient exhaust-gas-driven AiResearch turbocharger moves 60% more air through the big 14-in. diameter air cleaner. This air is packed into the cylinders for minimum fuel consumption and higher power with lower exhaust gas temperatures.

Get the full story on the new UDT-1091 and the other 17 International high-output engines from your nearby International Power Unit Distributor or Dealer. His parts and service support is as dependable as the engines he sells! Call him soon.

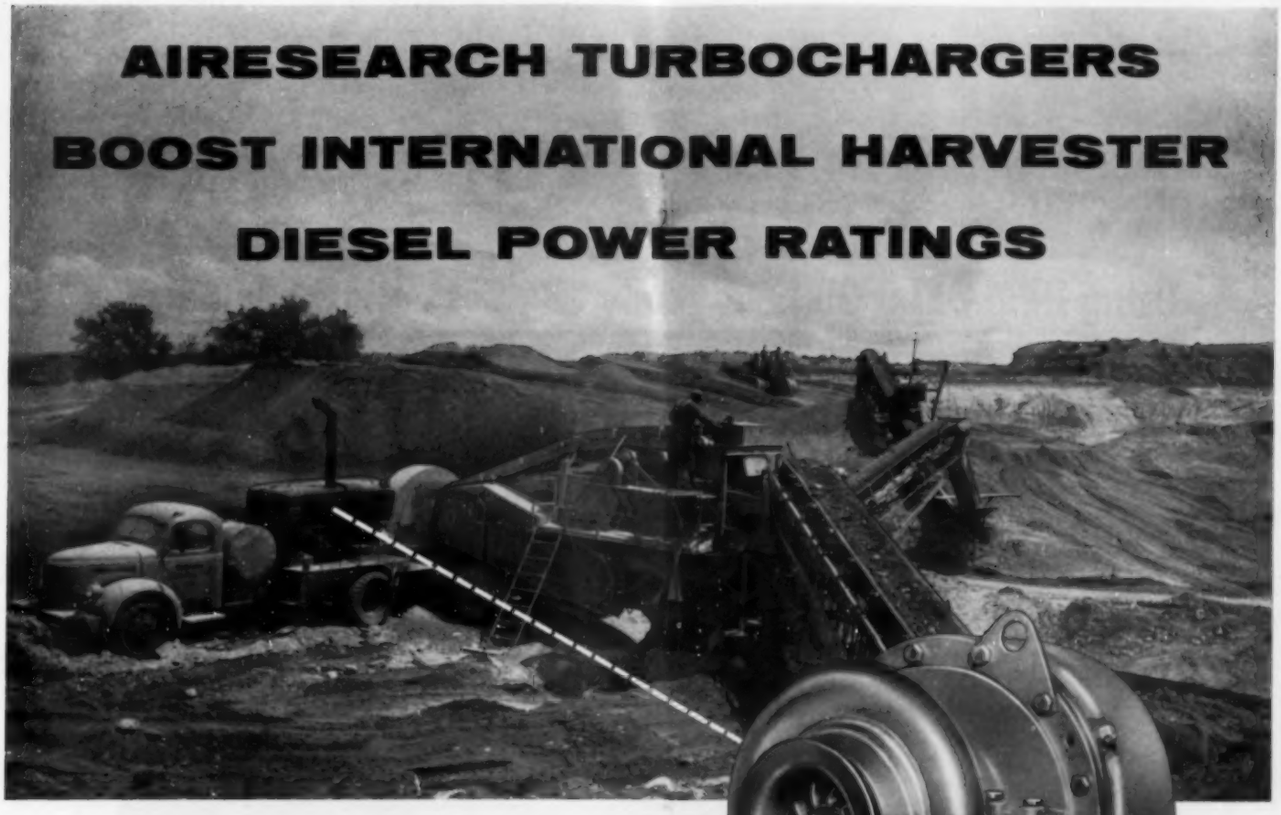
INTERNATIONAL®

International Harvester Company
180 North Michigan Ave., Chicago 1, Ill.

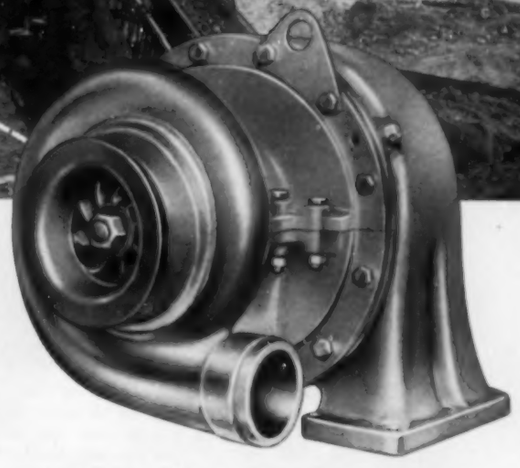
CONSTRUCTION EQUIPMENT

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

AIRESEARCH TURBOCHARGERS BOOST INTERNATIONAL HARVESTER DIESEL POWER RATINGS



AIRESEARCH TURBOCHARGED *International Harvester UDT 1091 diesel is used to power this rock crushing equipment 5000 feet high at Pueblo, Colorado. Rock crushed is from 10 inches maximum to one inch minus with a 40% crush. The AiResearch turbocharger has increased the rock crusher's production by 20%, and not only boosted horsepower 20 — 30% over the diesel's previous output at that level but actually raised it over its sea-level rating. Approximately 1800 tons of rock are being crushed in eight hours by the turbocharged UDT 1091 compared with 1400 tons in an equal period with a non-turbocharged unit. The AiResearch turbocharged UDT 1091 prevents stalling under heavy loads and has operated for over 2500 hours at elevations in excess of 5000 feet with no "down time."*



AIRESEARCH C-60 TURBOCHARGER NOW AVAILABLE ON INTERNATIONAL HARVESTER UDT 1091 DIESEL ENGINE

Installation maintains sea-level output up to 12,000 feet with an important decrease in fuel consumption

AiResearch turbochargers have an outstanding record of operation in the field. Features include turbine wheels of unmatched efficiency, air-cooling which eliminates the need for complicated plumbing and ease of installation and maintenance. Thermal loading on the engine is lower by comparison than any other turbocharging or supercharging installation. Your inquiries are invited.

BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS					
MODEL	F-51	C-60	A-60	E-100	B-100
Diameter — in. nom.	10	11.5	15.25	15.1	15.4
Length — in.	10.5	12.9	16.75	14.7	17.1
Weight — lb.	40	95	125	112	135
Output — lb/min. (Standard Conditions)	29-51	30-60	38-60	50-100	60-100

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

FIRM C. H. LAWSON, INC.

Using RPM DELO Oil heavy-duty engines outlast equipment

C. H. Lawson, Inc. operates 78 pieces of road building equipment ranging from new to 15 years old, all using RPM DELO Oil. Only one engine has ever required major overhaul and that was not due to lubrication. Firm's chief mechanic, E. C. Miller, says, "RPM DELO Oil has been used exclusively in all our heavy duty engines since 1944. In many cases, it has enabled engines to outlast the equipment." Euclid Earth Mover (above) gets a push from a bulldozer to provide extra traction in wet earth.

TD 24 International (left), one of firm's 12 bulldozers, helps clear the way for a Route 50 by-pass at Riverdale, Maryland. This two year old tractor has operated more than 4,000 hours without engine repairs. Company owner, C. H. Lawson (right), reports that RPM DELO Oil keeps the engines in his equipment in such good shape that—regardless of operating conditions—they average approximately 4 years or 10,000 hours service before even minor repairs are required.

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrorosion of bearing metals
- Inhibitor resists crankcase foaming

For More Information or the name of your nearest distributor, write or call any of the companies listed below.

LUBRICATING OILS RPM DELO

TRADEMARK "RPM DELO" AND DESIGN REG. U.S. PAT. OFF.

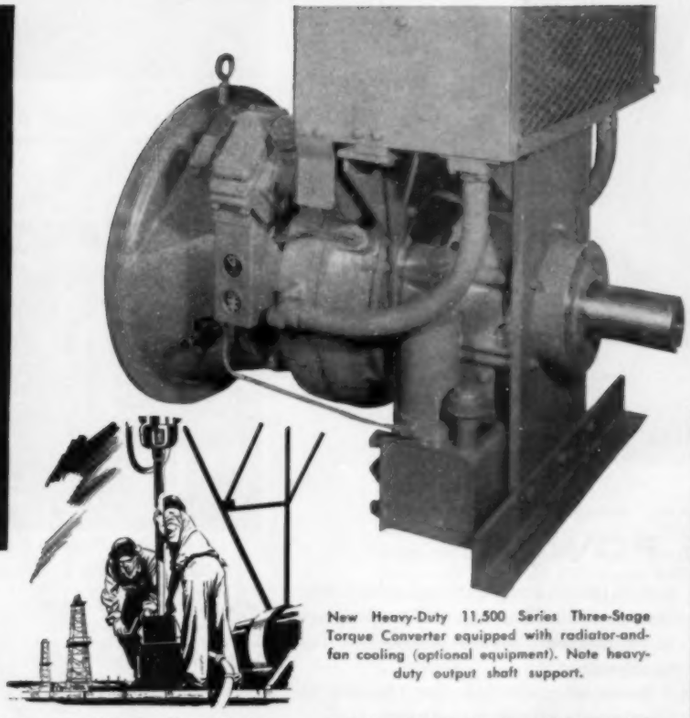
STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20

THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso

THE CALIFORNIA COMPANY, Denver 1, Colorado

Twin Disc announces new Heavy-Duty 11,500 Series Torque Converter



New Heavy-Duty 11,500 Series Three-Stage Torque Converter equipped with radiator-and-fan cooling (optional equipment). Note heavy-duty output shaft support.

Further extending its line of three-stage torque converters, Twin Disc Clutch Company now offers industry an additional version of its popular 11,500 Series Three-Stage Torque Converters.

Designated the Heavy-Duty 11,500 Series (a Standard-Duty version will be continued), the new units have a maximum rating of 586 hp at 2200 rpm. Maximum input torque is 1400 pound-feet. Impellers are available for specific torque ratings of 340, 390, 450 and 540 pound-feet.

Current production units include the Model CF, which provides a clutch at the flywheel, and the Model F, which is connected to the flywheel with a driving ring.

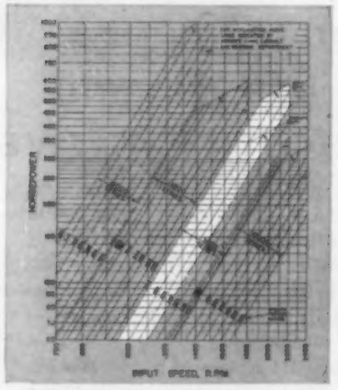
A Twin Disc C-3 Rear End, with the output shaft supported by two heavy-duty roller bearings, is available with either model, permitting maximum output sidepull.

The complete line of Twin Disc Three-Stage Torque Converters includes five distinct sizes; the 10,000 Series, Standard-Duty 11,500 Series, Heavy-Duty 11,500 Series, 13,800 Series and the 16,000 Series. The line offers 33 specific torque ratings and input and output arrangements to meet virtually every industrial requirement from 60 to 1000 hp and from 700 to 2400 rpm.

These three-stage torque converters have long proved themselves on such applications as crawler tractors, drilling rigs, shovels, yarders, locomotives and many, many others. They offer such advantages as multiplying engine input torque (up to 6:1) exactly as required by load . . . cushioning out destructive shocks and vibrations . . . minimizing maintenance and downtime . . . and *producing more work on a hp-cost basis.*

Twin Disc, the only manufacturer producing both three-stage and single-stage designs, offers single-stage torque converters for engines producing 30 to 212 hp. Besides this, Twin Disc makes available a complete line of fluid couplings, to 850 hp, and friction clutches, to 1050 hp.

Twin Disc Clutch Company, Racine, Wisconsin; Hydraulic Division, Rockford, Illinois . . . with parts and service facilities throughout most of the world.



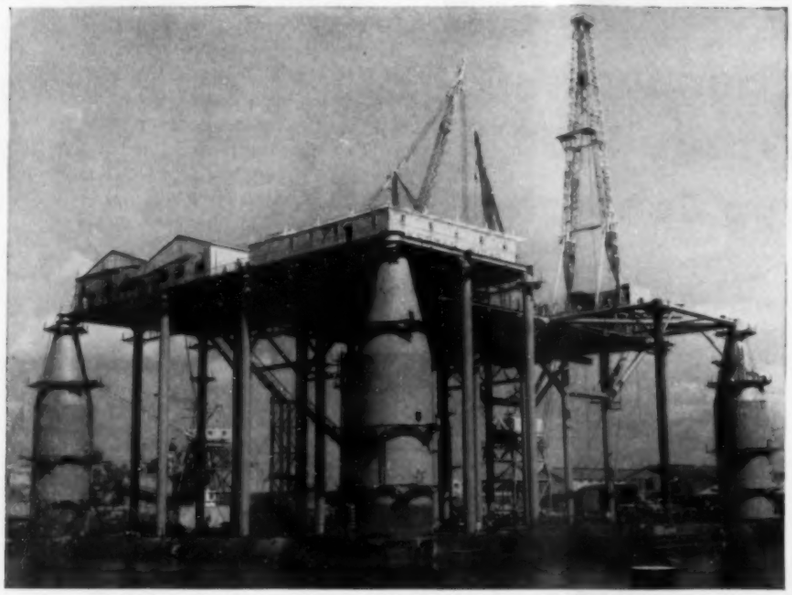
Unshaded area in above curves compares hp and rpm characteristics of the Heavy-Duty 11,500 Series Torque Converter with other Twin Disc Three-Stage Torque Converters.

TWIN DISC

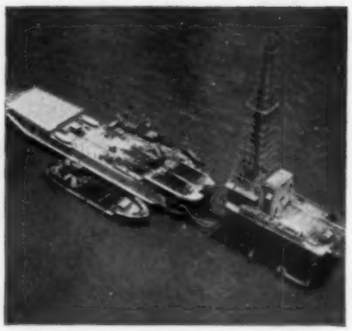
TWIN DISC

Torque Converters

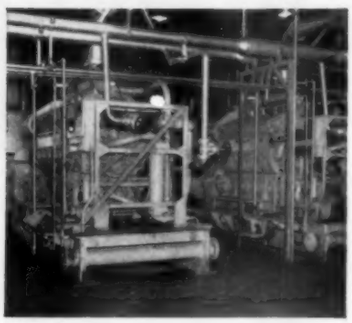
FIRST A TENDER — AND NOW THE GIANTS



Kermac Rig 46 is a new type of giant mobile barge capable of drilling in 70 feet of water. Rig 47, recently launched, is of identical design.



Kermac Tender III and Rig 48—first tender platform to have a complete Diesel-electric power system.



Opposite the drilling platform on Rig 46 are three Electro-Motive 900-hp generating sets. Each of these 8-cylinder engines drives two 500-kw generators and comes complete on skids with air or water cooling, engine and generator controls.

Typical arrangement of Electro-Motive 625-hp dc drive motors with mud pumps is shown on Rig 46. Similar motors on the draw works are equipped with the new Super-Excitation control which provides a braking action when power is removed.

Pioneer Kermac fits new rigs 46 and 47 with

ELECTRO-MOTIVE POWER

Kerr-McGee Oil Industries, Inc., was the first to operate a tender-platform with a complete Diesel-electric power system. The tender, Kermac III, working with Rig 48 in the West Delta Area has demonstrated its ability to make hole fast—recently drilled to 14,088 feet in 67 days.

Kermac III is powered by two Electro-Motive 900-hp generating units that team with a third on Rig 48 to power electric drive motors on draw works, rotary and mud pumps.

Kermac's new giants—Rigs 46 and 47—are of radically new design, yet their power is the same as that for Kermac III and Rig 48. The reason? Flexible electric cables between generating units and drive motors permit complete freedom of power arrangement. Thus, rigs can be designed to requirements without restrictions due to alignment.

Power to make hole fast; flexible to meet varying drilling conditions; simple, accurate controls; matched components, designed and built by one manufacturer—these are reasons why more offshore rigs use Electro-Motive Power than any other Diesel-electric drilling system.

Both land and offshore rigs are successfully reducing drilling time and costs with Electro-Motive Power. See or call your Electro-Motive representative for complete information.

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

LA GRANGE, ILLINOIS · *In Canada:* General Motors Diesel Limited, London, Ontario

Petroleum Industry sales offices: Dallas and Houston, Texas; Morgan City, Louisiana; Los Angeles, California.

Neodesha packs 1-2 performance punch

1 | *Nordberg Diesels* 2 | *STANODIESEL Oil M*

Operator J. N. Finkinbinder (left) and Everett Powell, Neodesha Superintendent of Electric and Water Plants, adjust rocker arm assembly of Nordberg Duafuel Engine. Engine operated 40,431 hours before overhaul, carrying about 90% of load. All engines in service at Neodesha are Nordberg's. All use Standard Oil's STANODIESEL Oil M.

Finkinbinder and Powell inspect oil filter used for filtering STANODIESEL Oil M used in all six Nordberg Diesels at Neodesha, Kansas, power station.

Quick facts about STANODIESEL OIL M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by using economy fuels.
- Maintains film on difficult to lubricate parts.
- Eliminates spark plug fouling in spark-ignited gas engines and reduces combustion chamber ash and deposits in engines burning natural gas, LPG and liquid fuels.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.

The city of Neodesha, Kansas, has six Nordberg engines in service. They have operated more than 400,000 hours on Standard Oil diesel lubricating oils. Here is the case story of one of these engines. The performance of this engine is typical.

In 1952, the city of Neodesha installed a 1,750 hp., 1230 kw., Nordberg Duafuel engine. During the period between February 14, 1952, when the engine went into service, and March 1, 1956, the engine ran 34,370 hours out of a possible 35,784. This is 96% of the engine's total installed hours. In this time, not even a piston or cylinder head was removed. So good was the performance of this engine using STANDARD HD Oil that when Standard introduced an improved diesel oil—STANODIESEL Oil M—in February, 1955, this engine was converted to this new oil.

There is more to the story. The engine continued in service to 36,223 hours when No. 7 cylinder liner was pulled to put rubber gaskets on liner to stop water leakage. At this time, No. 7 piston and liner were checked. Liner wear averaged only 0.0045 inches. The top ring showed an average wear of 0.016 inches. The No. 2 ring was 0.020 inches. Little, if any, wear was indicated on other rings. Now, at 40,431 hours, the engine is down for overhaul of turbocharger and to have valves ground. Bearings were found in excellent condition. No pistons are to be pulled.

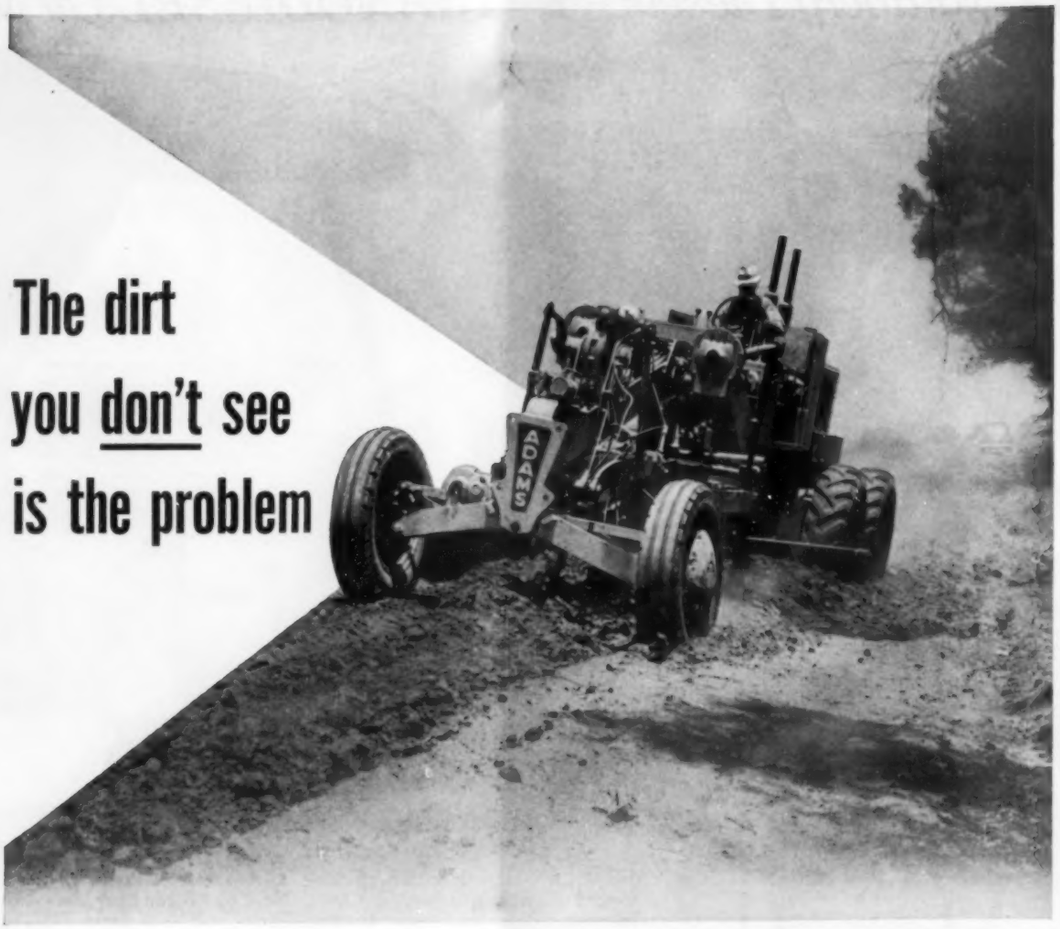
Get more facts about STANODIESEL Oil M by calling the Standard Oil office near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY
(Indiana)

CH-2276

The dirt you don't see is the problem



Le-Tourneau-Westinghouse Adams "660" Grader, powered by 150 H. P. Diesel Engine

Dry Type Micronic® Air Filtration solves it

The tons of dirt this grader moves in a day don't give it any trouble at all. But just let a little of the dirt that's drawn in with the air intake get through to the engine and it'll stop dead in its tracks. That's why efficient air filtration is so vital to the operation of this equipment . . . why engine and equipment manufacturers have accepted PurOlator's new Dry Type Micronic® Air Filter as the most efficient yet developed.

Whether your engine is idling or revving at top speed, this new Purolator Air Filter removes 99% of all contaminants. That makes it virtually impossible for harmful abrasives to get into the precision parts of the engine no matter how dirty the job or where you're working. The Dry Type Micronic elements save time and effort in servicing, too. Elements can be replaced in one-tenth the time – and with one-tenth the effort – needed to service other types.

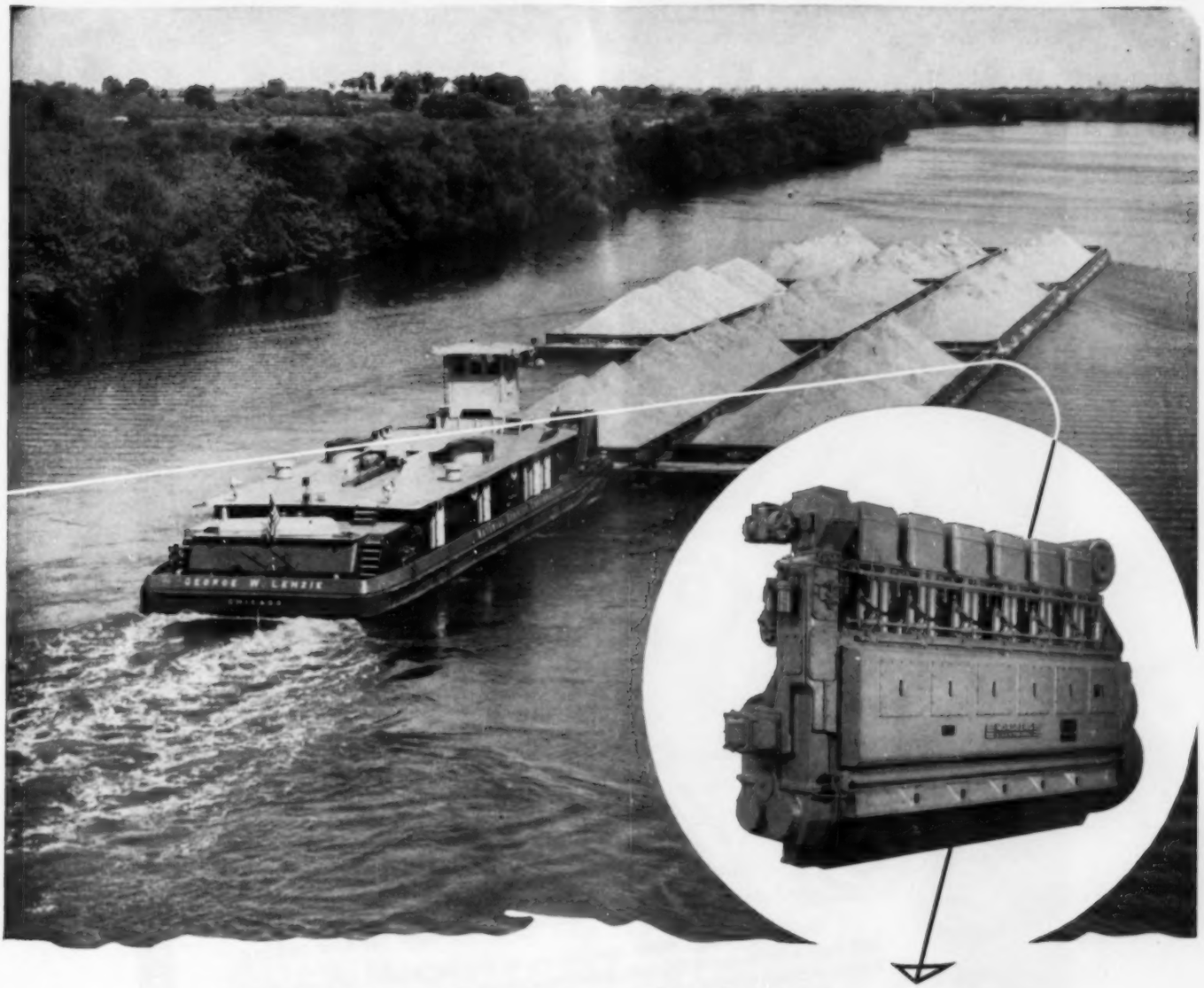
Purolator Catalog AFC-56 contains a valuable chapter "Facts about engine air requirements" that can help you prolong engine life and reduce repair bills. Send for your free copy today. Address Dept. DP9-210.

FILTRATION FOR EVERY KNOWN FLUID

PUROLATOR

PRODUCTS, INC.

RAHWAY, NEW JERSEY



Another new Material Service Towboat...
powered with two NORDBERG *Supairthermal*® DIESELS

• The new twin-screw towboat *GEORGE W. LENZIE* has now been added to the Material Service Corporation's workboat fleet. This modern 110-ft. motor vessel has a 30-ft. beam, and is the largest, most powerful towboat ever built for use on the Chicago River system.

Shown here as she pushes eight heavily loaded 195'x35' barges up-river, the *LENZIE* depends on her two powerful 800 hp Nordberg *Supairthermal* direct reversing Diesels to maintain rigid round trip schedules . . . with loads up to 12,000 net tons.

Material Service Corporation's selection of two Nordberg Engines to power the *LENZIE* was based on the excellent performance of the two identical *Supairthermal* units installed in her near-sister vessel, *IRVING CROWN*. To provide the lower propeller speed desired for greater wheel efficiency in the *LENZIE* these new engines develop their rated horsepower at 176 BMEP.

For *your* next towboat propulsion job, consider the logical advantages of Nordberg power. *Nordberg Mfg. Co., Milwaukee, Wisconsin.*

• Nordberg *Supairthermal* In-Line Diesels are now built in sizes from 535 hp upwards. For larger river towboats, requiring from 4000 to 8000 hp, *Supairthermal* V-type Marine Diesels are your logical choice for compact, heavy duty twin-screw propulsion. Write for details, outlining your power requirements.

NORDBERG
DIESEL ENGINES

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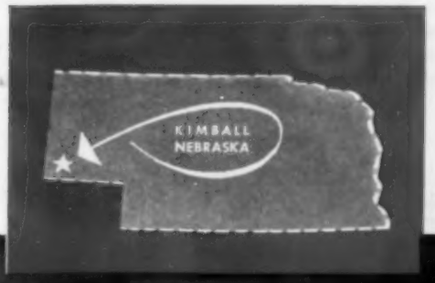
Kimball's power plant saves $58,000 yearly!



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SUPERIOR DUAL-FUEL ENGINES

Six years ago, fast-growing Kimball, Nebraska decided to modernize its inadequate power plant. Today, powered by three Superior Dual-Fuel Engines, Kimball's power plant is saving $58,000 a year over private utility rates. The engines operate with natural gas at an average cost of 6.93 mills per KWH. On diesel fuel alone power costs are 10 mills per KWH, and annual savings would be $35,000.

The first engine paid for itself in savings in less than three years! Repeat orders later demonstrated the confidence of Kimball city fathers in Superior engine quality. As a further bonus, the three engines are expected to give good service for 35 to 40 years, according to the town's Public Works Director.

Such *savings, satisfaction* and long-term *service* are characteristic of White's Superior engines. See how you can participate in "Kimball-type" savings. Call or write the nearest office listed below. Let White's engineers discuss the new features of Superior and Atlas engines, ranging from 100 to 2150 H.P., for power to 1500 KW.

White Diesel

WHITE DIESEL ENGINE DIVISION

THE WHITE MOTOR COMPANY Plant and General Offices: Springfield, Ohio

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Michigan-Ohio News

By Jim Brown

AN Insley model "L" Crane owned by Somerville Construction Co. of Ada, Michigan, is being converted from gasoline to diesel by Peninsular Diesel of Detroit. The new engine will be a model 3057C GM Detroit Diesel.

CUMMINS Diesel Michigan, Inc. has installed a model NHBI-600 Cummins diesel in a model LJ Mack truck for Midland County Road Commission in Michigan.

NAGELKIRK and Ranta of Grand Rapids, Michigan, have a new model HOD Hough Payloader powered by a Hercules diesel and an International Harvester TD-14 tractor. The new equipment was delivered by the Grand Rapids branch of Wolverine Tractor and Equipment Company.

THE local distributors of Caterpillar equipment, Michigan Tractor and Machinery Co., have announced a new salesman, Don Graver, for Bay, Genessee and Saginaw Counties. Mr. Graver began working for Michigan Tractor and Machinery Company as a mechanic in 1949. He became parts manager in 1953, general parts manager in 1954 and with his promotion is now a full fledged general line salesman.

STANLEY Hayes of Livonia, Michigan, has had a model NRTO-6-T Cummins diesel installed by Cummins Diesel Michigan, Inc. in his 8 in. dredge pump. The dredge pump will be used in Mr. Hayes' gravel pit in Northville, Michigan.

KILLENS Gravel Company of Ann Arbor, Michigan, has had their model 332 Marion crane (¾ yd) converted from gasoline to diesel. The job was done with a 3055C GM Detroit Diesel by Peninsular Diesel of Detroit.

A NEW International Harvester TD-18 crawler-tractor equipped with a hydraulic bulldozer blade is being broken in by Ford Motor Company at the proving grounds in Romeo, Michigan. The sale was made by the Detroit branch of Wolverine Tractor and Equipment Company.

TELFORD Equipment Company of Detroit, Inc. has delivered an Austin Western Primary Crushing Plant powered by a model 6-71 GM Detroit Diesel engine to Gargaro and Souter, Inc. of Detroit.

CHARLES B. Mosely, a gravel hauler in Detroit, had a new model NRT-6-B Cummins diesel installed in his Autocar. The installation was done by Cummins Diesel Michigan, Inc.

PENINSULAR Diesel of Detroit are installing a 4057C GM Detroit Diesel in a model 104 Galion Grader for Globe Construction Company of Kalamazoo, Michigan.

THE Grand Rapids branch of Wolverine Tractor and Equipment Company has delivered a TD-14 crawler tractor equipped with a hydraulic bulldozer blade to St. Joseph County Road Commission of Centerville, Michigan.

ED LEVY Company of Detroit has accepted delivery on two Koehring model 605 excavators powered by GM 6-71 Detroit Diesels. The new Koehrings were purchased from Earle Equipment Company of Detroit and will be broken in on a slag operation in Detroit.

THE Detroit Edison Company has purchased a Cat D9 crawler tractor equipped with a Balderson 9-U Coal Blade. The new Caterpillar tractor was sold by Michigan Tractor and Machinery Company and will be broken in stockpiling coal.

On its second fleet of 70 GP 9 locomotives

Illinois Central again equips diesels with Air-Maze oil bath filters

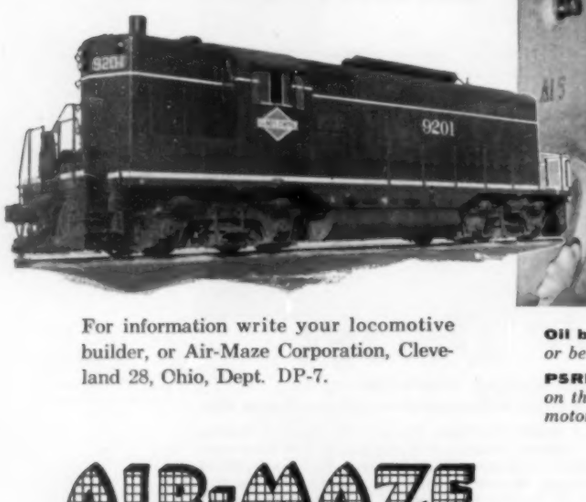
The reason is simple... longer wear from cylinder liners, pistons and rings; less cost for fewer repair parts and fewer maintenance manhours.

This is the record *after two years' testing* of oil bath filters on switchers, road switchers, and passenger locomotives.

And this is the reason why the second fleet of 70 diesels like the first fleet... 245,000 horsepower in all...is completely protected with Air-Maze oil bath filters.

Actually 59% more fine dust is removed by Air-Maze oil bath filters than the next best filtering device. And by filtering the air in a bath of oil, high filtering efficiency of the oil bath filter is maintained even at lowest engine speeds.

What's more, the oil bath filter operates 3 months or longer with minimum maintenance.



For information write your locomotive builder, or Air-Maze Corporation, Cleveland 28, Ohio, Dept. DP-7.

Oil bath filters *(upper left) maintains 92% efficiency or better in cleaning intake air in a bath of oil.*

PSRR car body filter panels *(upper right) also used on this railroad to pre-filter air going to engine, traction motors, compressor, and generator.*

AIR-MAZE
The Filter Engineers

DEDICATED TO PROGRESS
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ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • PASSENGER CAR FILTERS

CUMMINS Diesel Michigan, Inc. has installed a model HBI-600 Cummins diesel rated at 150 hp in a GE 45-ton locomotive. The locomotive is being used in a foundry by the Ford Motor Company.

FOR Proper-Saylor Excavating Company of Pontiac, Michigan, Peninsular Diesel of Detroit has installed a model 3055C GM Detroit Diesel engine in a Lorain TL-22 shovel. The Lorain shovel was formerly driven by a gasoline engine.

WOLVERINE Tractor and Equipment Company of Detroit and Grand Rapids has delivered an International Harvester TD-18 crawler tractor to Charles Burnash of Montrose, Michigan.

MICHIGAN Tractor and Machinery Company has delivered to Ayling Asphalt Paving Co. of Adrian, Michigan, a Caterpillar model D375 Turbo Supercharged diesel generator set and a Cat D311 diesel generator set.

A GALION model T-600 Motor Grader powered by a 150 hp JBIS-600 Cummins diesel has been purchased by the Otsego County Road Commission. The Galion grader was delivered by the Grand Rapids branch of Wolverine Tractor and Equipment Company.

CUMMINS Diesel Michigan, Inc. is installing a "trial engine" for Wayne Transportation Company of Detroit. A 175 hp model JT-6-B Cummins will be used as the first diesel engine to be installed for Wayne Transportation's fleet of trucks.

PRESQUE Isle Road Commission in Rogers City, Michigan, has accepted delivery on a model HOD Hough Payloader. The Payloader is powered by a JN-6-BN Cummins diesel and was purchased from Wolverine Tractor and Equipment Company of Detroit and Grand Rapids.

Management Appointments

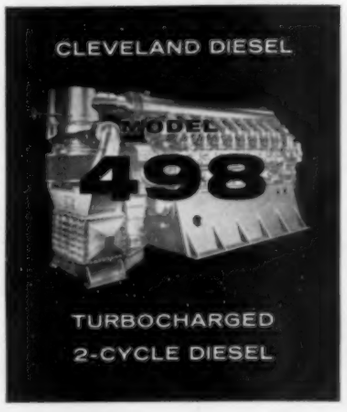
The De Laval Pacific Company of Millbrae announces the election to Executive Vice President of Mr. Earle C. Elvidge, formerly General Manager and Vice President. Mr. Dick M. Landis, Assistant General Manager, was elected Vice President. Other officers elected were Mr. C. B. Schmidt, Chairman; Mr. W. A. McGill, President, and Mr. James M. Nicol, Secretary and Treasurer.

Retaining Ring Catalog

Publication of a new 1957 Edition Catalog and Application Idea Manual for Spirolox, the gapless, two-turn, coil action retaining ring, is announced by Thompson Products, Inc., Piston Ring Division, (Ramsey Corporation) St. Louis, Mo. "In the new edition," the announcement continues, "are 20 pages of new application and specification data covering standard 'catalog' sizes and special designs for specific applications. Also illustrations and data, showing how Spirolox coil spring action expands or contracts to position or lock moving parts, pinions, bushings, bearings, etc. on shafts and in housings to eliminate nuts, caps, machined parts, pins, keys and other locking and positioning devices. Illustrations show how Spirolox can be inserted or removed without use of special tools. Spirolox provides special advantages from a servicing and maintenance standpoint. While requiring no special tools for installation, the rings are easily adaptable for use with fixtures for automatic production line installation, details of which are also contained in the new Spirolox catalog." Complimentary copies of the new Spirolox Catalog are available by writing Thompson Products, Inc., Piston Ring Division, (Ramsey Corporation) St. Louis 8, Mo.

ITS NEW

Two more Turbocharged 2-Cycle Cleveland Diesels go into service



West Kentucky Coal Company's M/V Mark Eastin 5600-H.P. History-Maker

The West Kentucky Coal Company's new towboat, the M/V MARK EASTIN, is the most powerful towboat to operate on the inland river system of the United States.

The 5600-horsepower M/V MARK EASTIN is powered with two 16-cylinder Turbocharged 2-cycle Cleveland Diesel Model 498 engines, the latest and greatest advancement in Diesel engine design.

For the best return on your investment, pick Cleveland Diesel power for your work boat, as the West Kentucky Coal Company did.

A GOOD PRODUCT PLUS GOOD SERVICE GIVES TOP PERFORMANCE

CLEVELAND DIESEL

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CLEVELAND DIESEL

Florida Diesel News

By Ed Dennis

TWENTY-FOUR model J. T. 6-B., with 20 degree tilt, Cummins diesel engines, each rated 175 hp, were installed in the #9000 T. D. White hi-way tractors delivered to Central Trucking Co., Tampa. They will haul general freight between Florida cities and Atlanta, Georgia.

SHELLEY Tractor & Equipment Co., Miami, engineered and installed the D337 Caterpillar diesel (the unit contains the new 150 kw Caterpillar S. R. C. V. generator) at the Holsum Bakeries in South Miami for standby and peak load demands.

TWO 4 cyl. General Motors diesels, of the 71 series with G. M. hydraulic r&r gears, were installed in a 55 x 15 steel sightseeing vessel constructed at the Miami Shipbuilding Co. yards.

J. F. Knorr supplied the model 6DA844 Buda diesel, 5¼ x 6½ b. and s., 148 max. hp at 1200 rpm, which will supply power for the 8 in. Maddox sand pump on the dredge delivered to Maurice-Sidders of Delray Beach.

A V12 Cummins diesel, model N. V. H. I. 1200, was installed in the 4 yd model 88B Bucyrus-Erie dragline that was recently delivered to the Hooper Equipment Co.

AT FT. Lauderdale, Ellis Diesel Sales & Service repowered the yacht *Captor* with a General Motors 6-71 diesel and G. M. 3:1 hydraulic r&r gears. It has a 36 x 30 five blade propeller and made 10½ knots at 1600 rpm on the trial runs. A report on the fuel consumption, etc., during its trip back to Canada will be published later.

A MODEL 525 International diesel engine, 100 hp, was installed in the 118 Galion motor road grader which was recently delivered to the Palm Beach County commissioners by the Florida-Georgia Tractor Co.

THE *Big Mo*, a 32 ft pusher type tug, was sent to Alonzo Cathron at Islamorodo in the Florida Keys after being built at Dade Drydock Co. It is powered with a model AA107 Murphy diesel and Twin Disc 1.96:1 r&r gears and will be used as a dredge tender, etc.

THREE Superior diesels, model 40-S-6, naturally aspirated, rated 260 hp at 720 rpm, with 150 kw Ideal 60 cycle, 480 volt generators and 5 kw exciters, were installed at the Hunter Air Force Base, Savannah, Ga. Installation included two Quincy, model D325, air compressors, Maxim MU silencers, Air Maze air filters and Woodward UG 8 governors, for standby power in ordnance storage areas.

RECENT General Motors diesel installations in construction equipment included a 6-110 with Twin Disc clutch in an Allis Chalmers H. D. 20 dozer for R. E. Mills of Pompano Beach and a 3-71 in a Buckeye #160 ditch digger for Constructors of Florida at Coral Gables.

THREE Nordberg radial type 11 cyl. diesels, 14 x 16, 1655 bhp at 400 rpm, will supply power for water pumps at the #9 pumping station of the Southern & Central Florida Flood Control Project which was recently finished. Installation included Burgess-Manning snubbers, American air filters, Marquette governors and Manzel lubricators.

THAT International, #65 Payhauler, off-the-highway, 12 cu yd truck which Florida-Georgia Tractor Co. loaned for trial work outs, has been widely acclaimed by South Florida contractors. Specifications are: 40,160 lbs empty, a NT6BI turbocharged 250 hp Cummins

Typical of the 30 General Motors Training Centers, offering one-week courses in Delco-Remy equipment, is this Detroit unit.

diesel, Bendix Westinghouse air compressor and Donaldson air filters.

AUTO Marine Engineers converted an ex-Navy L. C. V. P. to a combination sand sucker and work boat for use in the Everglades National Park. The G. M. 6-71 diesel has a Higgins 2:1 marine r&r gears and the other end of the diesel drives a 6 in. Maddox sand pump.

FROM the Jacksonville Branch Cummins Diesel Engines of Florida, six more model HM-600 Cummins diesels for the shrimp trawlers being built by Diesel Engine Sales at St. Augustine for Wells Bros. of Key West. These are 150 hp at 1800 rmp and 672 cu in. piston displacement.

LLEWELLYN Machinery of Miami has been named distributor for the Case line of dieselized crawler and wheel tractors for the southeastern section of Florida and the Tampa area.

FOR THE City of St. Petersburg's sewer system three model 8D. A. S.-1125 supercharged Buda diesels, 219 hp at 1200 rmp, 5¼b x 6½s, with 150 kw Allis Chalmers generators.

THREE 2T-55 International Payscrapers with 165 hp Cummins H. R. R. I. 600 diesel engines. These are the two wheel tractors used by J. D. Manly Construction Co. of Leesburg for the rebuilding of highway #441 north of Orlando.

THREE Fairbanks-Morse, 6 cyl. diesels, model 49B4½G, rated 132 hp at 1200 rpm, drive the 75 kw Electric Machinery auxiliary generators at #9 pumping station of the Southern & Central Florida Flood Control Project. These have the Schwitzer superchargers installed and the Bendix-Scintilla fuel oil system and Burgess-Manning exhaust silencers.

LAUNCHED at St. Augustine by Diesel Engine Sales Co., the 62 ft *Miss Ginger* marked the return of the Florida Branch of Detroit Diesel Div. to the boat building business. The details and engine were handled by the Jacksonville Branch. Installation included a 6 cyl. G. M. diesel of the 71 series turning a 46 x 38 five blade Columbian propeller through 4.5:1 G. M. hydraulic r&r gears for 11 knots.

JOHN W. Campbell of Princeton, in the Redland farming district, has a new portable irrigation pumping outfit mounted on a truck. The engineering and equipment supplied by Shelley Tractor & Equipment Co. included a D318 series G, 137 hp Caterpillar diesel, a model C. M. C. six in. Rainmaster pump plus the full swing nozzle and sprayers.

Robert Bosch Expands

Constantly increasing demands for its products and for its service have led the Robert Bosch Corporation to construct a headquarters building in the New York area, it was revealed by George Krieger, President of the Company. The new building, located in Long Island City, in addition to its expanded sales and administrative quarters, will have shop and laboratory facilities. Its construction marks a significant forward step in Robert Bosch's current business activities in the United States. The Robert Bosch Corporation also recently established a branch operation in San Francisco for the servicing of the Western States.

THROUGH THESE PORTALS pass the best-trained heavy-duty electrical specialists in the business!

Nowadays the key to profit in truck and bus service lies in the speed and efficiency of your operations. To help you reach that level of efficiency, General Motors Training Centers offer you a one-week training course in Delco-Remy heavy-duty electrical equipment—without tuition or obligation. With 30 of these schools throughout the United States, chances are there's one near you.

Designed to teach speed and efficiency, this course gives you or your men a thorough grounding in up-to-date service methods and factory-specified procedures. Expert factory-trained instructors, using the modern testing and service equipment, are your teachers.

The checking, testing and repairing of Delco-Remy heavy-duty voltage regulators, generators, cranking motors, distributors and other units are covered in the most efficient way—through classroom and practical shop experience.

There is no tuition for the course. Tools, equipment and supplies needed during the training period are provided at no cost. The student's only expenses are his transportation, meals and accommodations.

If you are engaged in truck and bus electrical service, apply for this outstanding course for yourself or for your men. To arrange for admission, write direct to Service School, Delco-Remy, or contact your local United Motors System distributor.

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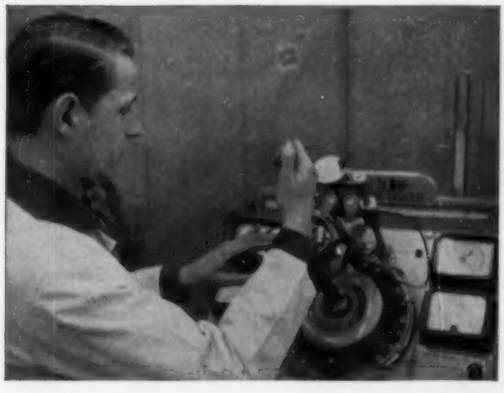

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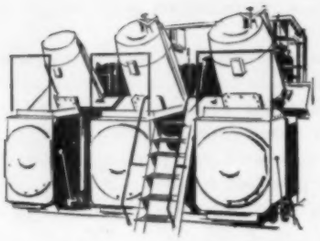
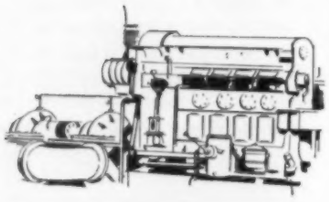
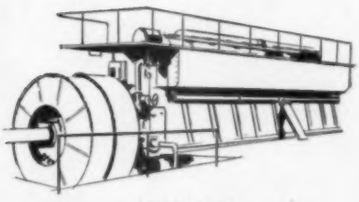
Marine



Engine compressor



Pumping



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CECILE ERICKSON
AN INTERNATIONAL ACHIEVEMENT

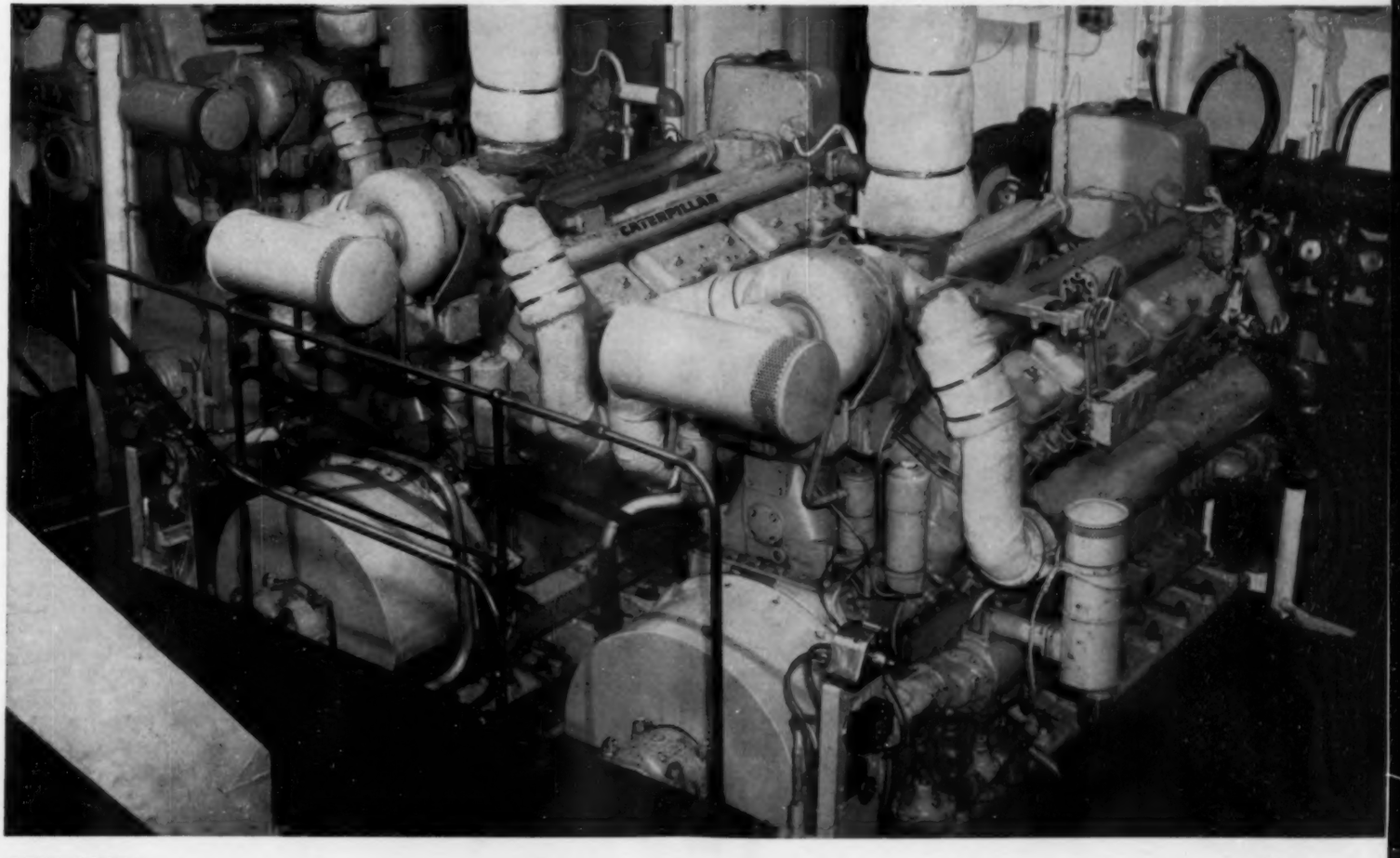
Built in Japan for West Indian Island Owners. Maiden Trip from Japan to Los Angeles Harbor to the Bahamas and Her Owners.

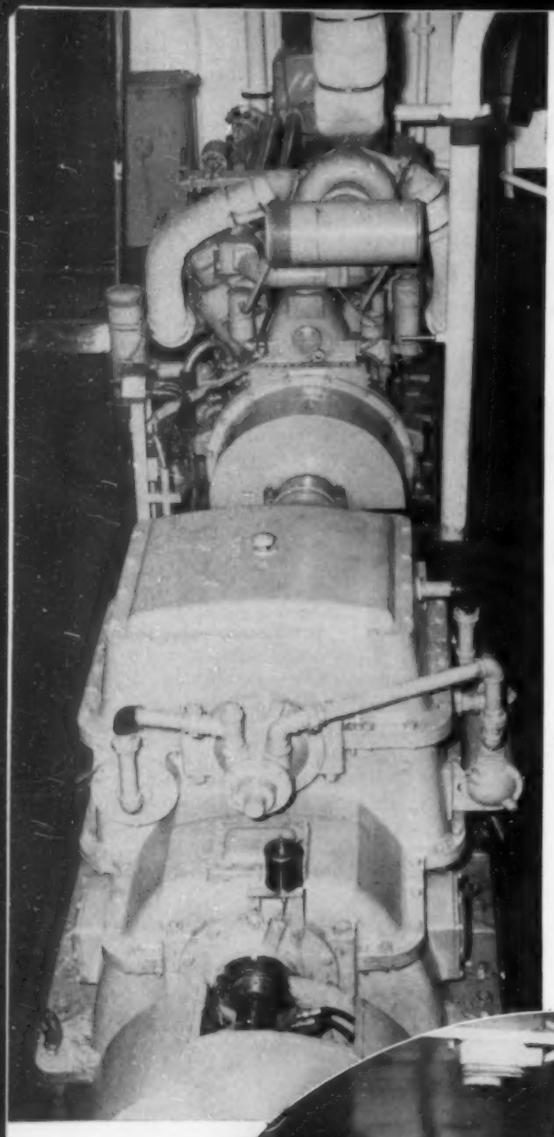
A UNIQUE, triple-screw cargo carrier, destined for transport service in the Caribbean area, recently completed its maiden voyage from Osaka, Japan, to San Pedro, California. The vessel, launched from the yards of the Osaka Shipbuilding Co., Ltd., on December 4, 1956, is the 5592 dwt. *Cecile Erickson*, owned by Inagua Transports, Inc., of Inagua, Bahamas. Designed specifically as a bulk cargo carrier, the vessel has gone into inital service transporting salt from Inagua, Bahamas, to processing plants on the East Coast of the United States. The new ship is truly an international venture. Built in Japan for Caribbean service, the *Cecile Erickson* has Liberian registration. Her Captain is J. J. Strokirk, an American, her chief engineer is Sigve Tysver, a Norwegian, and her crew hails from seven countries. It is well that Captain Strokirk is a bilingual gentleman with an ability to make himself understood in seven languages.

The ship is powered by four Caterpillar D397 turbocharged Marine Engines, and is the largest ocean-going craft to be driven solely by Caterpillar power units. The *Cecile Erickson's* deadweight tonnage more than doubles that of the 2,372 dwt. Caribbean tanker *Inagua Shipper*, which was previously the largest Caterpillar-powered vessel. The *Inagua Shipper* was placed into service by West Tankers, Ltd., in 1952, and her successful 5-year operating history was largely responsible for powering the *Cecile Erickson* with Caterpillar engines. The West India Shipping Company, Inc. is general agent for both Inagua Transports, Inc., and West India Tankers, Ltd.

The *Cecile Erickson* is 371 ft in length, has a 50 ft 6 in. beam, and a loaded draft of 20 ft 6 in. Her three cargo holds, especially designed for the easy loading and unloading of bulk cargo, extend the complete width of the ship, are self trimming, and are 223 ft in length, containing 213,316 cu ft of cargo space. The holds are of the open, non-stanchion type, and are given easy accessability by large hatches, having overall dimensions of 190 ft 10 in by 21 ft-4 in. Handling of bulk cargo is performed by two L26 Lorain crawler cranes, equipped with ¾ cu yd buckets, and powered by Caterpillar D315 diesel engines. On each side of the cargo hatches, extending the complete length of the vessel's main deck, are wooden runways, designed to handle the cargo loading and unloading cranes, and afford them ready access to either side of any hold. At the vessel's bow end, located

The two inboard propulsion engines on the *Cecile Erickson* are equipped with Twin Disc hydraulic couplings and Lufkin Model LM600V 4.27:1 reverse and reduction marine gears, the gearing in which is all parallel shaft herringbone gears able to take the full rated capacity of the unit in either reverse or forward. These engines are compounded through a Lufkin compound double pinion marine gear, having a reduction ratio of 1.406:1, giving a total reduction of 6.003:1. Note AiResearch turbochargers at stern end on each of the three engines visible in this photograph.

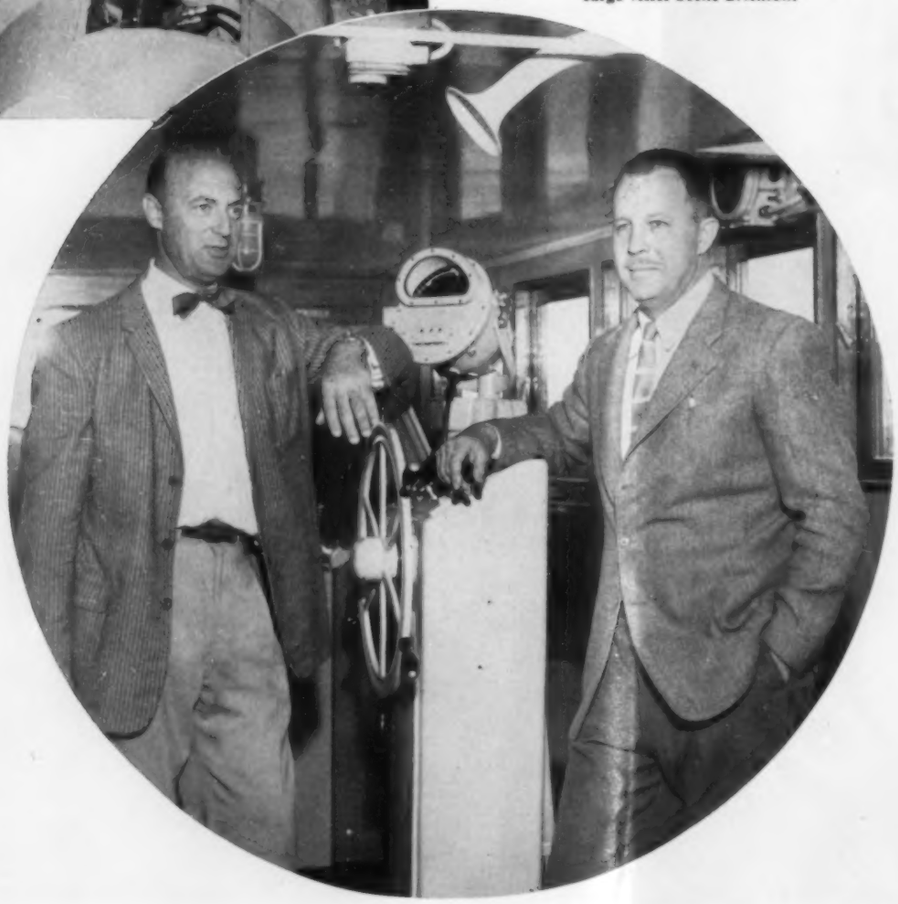




One of the outboard Caterpillar D397 turbocharged marine engines driving the *Cecile Erickson's* wing propellers. This engine is equipped with a Lufkin 4.27:1 reverse and reduction marine gear and 21 in. air tube disc clutch. The two outboard engines deliver 500 continuous hp each to drive the 4-blade 78 x 55 wing propellers.

between the fo'csle and forward hatch, is a wooden platform serving as storage space for the cranes while the vessel is underway. Another feature facilitating rapid and efficient cargo handling are the McGregor rolling hatch covers installed on the *Cecile Erickson*. The covers are mounted on rails extending the full length of the hatch, and can be easily positioned or removed for stacking by use of a capstan on the vessel's bow.

The four Caterpillar D397 engines providing propulsion power for the craft are equipped with Lufkin model LM-600V 4.27:1 reverse and reduction marine gears and 21″ air tube disc clutches. The two outboard engines deliver 500 continuous hp each to drive the 4 blade 78 x 55 wing propellers through 210 mm steel tailshafts. The two inboard propulsion engines and marine gears are equipped with Twin Disc Hydraulic Couplings, and are compounded to drive the center propeller through a Lufkin model LM-608C compound double pinion marine gear, having a reduction ratio of 1.406:1, giving a total reduction of 6.003:1. The inboard engines' combined output of 1000 hp is delivered through a 170 mm intermediate shaft to a 210 mm steel tailshaft, to drive the 4-blade 106 x 70 center propeller.



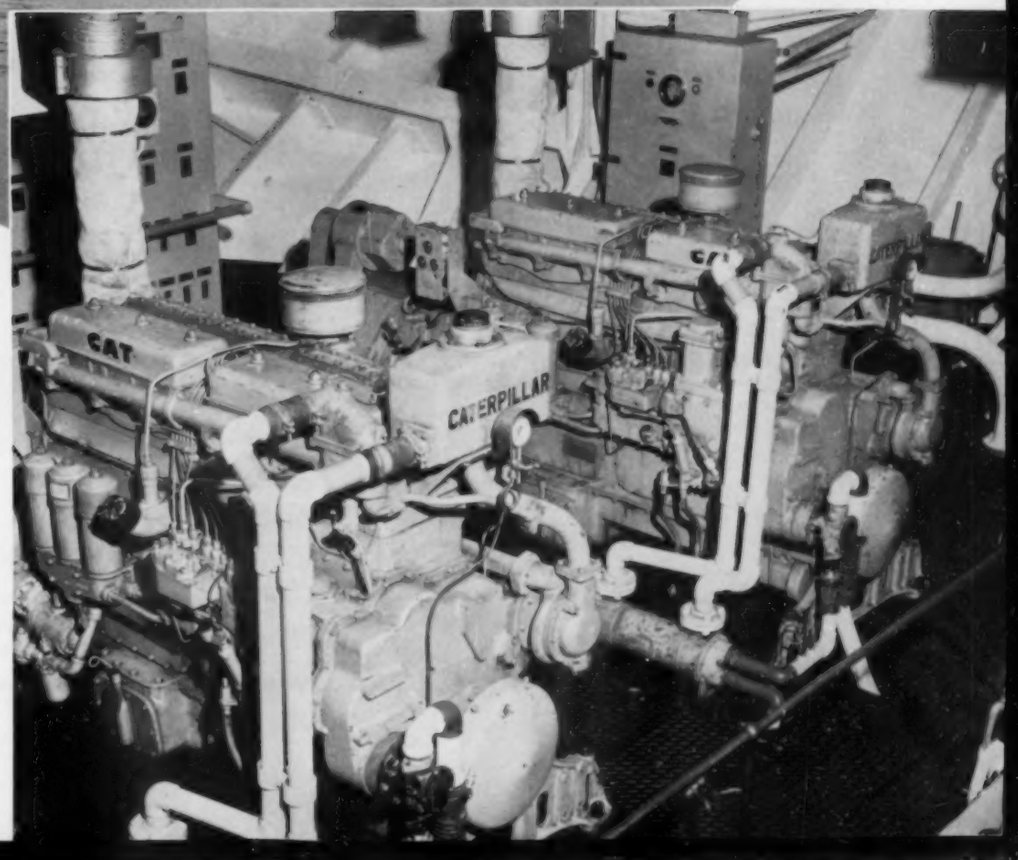
Left to Right: L. Henry Read, Jr., president of Inagua Transports, Inc. and James Strokirk, Captain of the cargo vessel *Cecile Erickson*.

The vessel's power control function is performed by three individual Westinghouse Air Brake controlair valves, one controlling each propeller. Each of the outboard controls operates a single engine and reverse gear, with the center control operating the two compounded inboard engines and gears simultaneously. This equipment is interlocked to insure simultaneous engagement and disengagement of the reverse gear clutches on the compounded engines. All four of the main engines are equipped with air starting systems and expansion tanks for jacket water.

The vessel has a designed top speed of 13 knots, which was accomplished during her trial runs in Osaka Bay, when a maximum speed of 13.445 knots was obtained under average trial conditions. During the initial ocean crossing, speeds ranged from 12 to 13 knots, depending on sea conditions. Fuel consumption during the maiden voyage averaged 576 gallons per day for each main engine, and the combined lube oil consumption for all engines averaged 8 gallons per day. The ship's fuel oil bunkers have a capacity of 130,000 gallons. Also installed in the engine room are two Caterpillar D342 electric sets, supplying all of the ship's electric requirements. The electric set generators are 3-phase, 60 cycle, 220-440 volt, 95 kw units. The Caterpillar D342 engines are equipped with a marine instrument panel, Maxim spark arrester silencers, lube oil and overspeed safety shutoffs, vernier governor controls, and air starting systems.

Navigational equipment on the *Cecile Erickson* includes radar, direction finder, and depth sounders manufactured by Radio-marine Corporation of America, and an RCA radiotelegraph transmitter. The steering compass is a Japanese-made Nuhatoni Keiki Seisakusko, and the master gyro compass was manufactured by Sperry Gyroscope Co. The vessel's steering gear has electric-hydraulic actuation, provided by a 7½ hp electric motor. Two Rex centrifugal bilge ballast pumps are also provided, having 4″ and 6″ outlet diameters. The vessel also has two fire pumps, one a 40 hp 125 psi electric Kira scroll pump, and the other a 20 hp electric Frijii two balance turbine pump. An emergency fire pump is powered by a 10 hp Petter diesel. Deck equipment includes two 20 hp electric vertical underdeck type anchor windlasses, and a 25 hp electrical mooring capstan. Compressed air for starting the main and electric set engines is supplied by two 7½ hp electric Worthington air compressors, rated at 30 cubic feet per minute at 240 psig. A 4 hp emergency air compressor is also available for stand-by. Wash water pumps, culinary water pumps and sanitary pumps are Kira scroll type, supplied by Toyo Sniko Co., Ltd. The vessel's fresh water tanks have a capacity of 33,500 gallons. The pilot house and living quarters for the officers and crew of the *Cecile Erickson* are located aft, and provide accommodations for a normal complement of 29.

The 5592 dwt. bulk cargo carrier *Cecile Erickson* completes her maiden voyage from Osaka, Japan to San Pedro, California. Destined to see initial service transporting salt in the Caribbean, the craft is 371 ft in length, has a 50 ft 6 in. beam, and a loaded draft of 20 ft six in.



Supplying all electrical power for the *Cecile Erickson* are two Caterpillar D342 electric sets, equipped with 3-phase, 60-cycle, 220-440 volt, 95 kw generators. The Caterpillar D342 engines are equipped with marine instrument panel, Maxim Type SC spark arrester silencers, lube oil and overspeed safety shutoffs, vernier governor controls, and air starting systems.

2000 HP TUG *SPARTAN*

Canal Type Tug Uses Turbocharged Engine.
Arnold B. Newell Discusses The Whys And The Wherefores.

With lowered pilothouse the *Spartan* will clear the bridges over the New York State barge canal while engaged in traffic between the Great Lakes and the Atlantic seaboard.

WITH delivery of the 2000 hp *Spartan*, the James McWilliams Blue Line, Inc. of New York has a fleet of seven diesel driven tugs for use in their barge operation on the Great Lakes, New York Barge Canal, waters around New York City and short coastwise voyages. The principal commodities carried are petroleum, chemicals and coal. The service extends as far west as Chicago, Illinois. Undoubtedly the most interesting feature of the new *Spartan* is the installation of a 2000 hp Cleveland Diesel Engine Division, General Motors Model 12-498 turbocharged 2-cycle diesel in a hull that is extremely compact being only 90 ft in length over all and a 23 ft 11¼ in. beam.

In an interview with Mr. Charles F. Kellers, President of the James McWilliams Blue Line, he said the high power of the new tug should have many advantages in his barge service by reducing the towing time and thus rendering even better service to the many shippers over this line. He refers to the *Spartan* as a "floating package of high power" with good accommodations for crew and adequate dimensions for the trade in which the McWilliams Blue Line is engaged. Having in mind that New York State Barge Canal operation imposes limitations of height and draft the design characteristics of the *Spartan* are of considerable interest, as worked out in detail by the Marine Design Section of the Cleveland Diesel Engine Division of General Motors located in New York City.

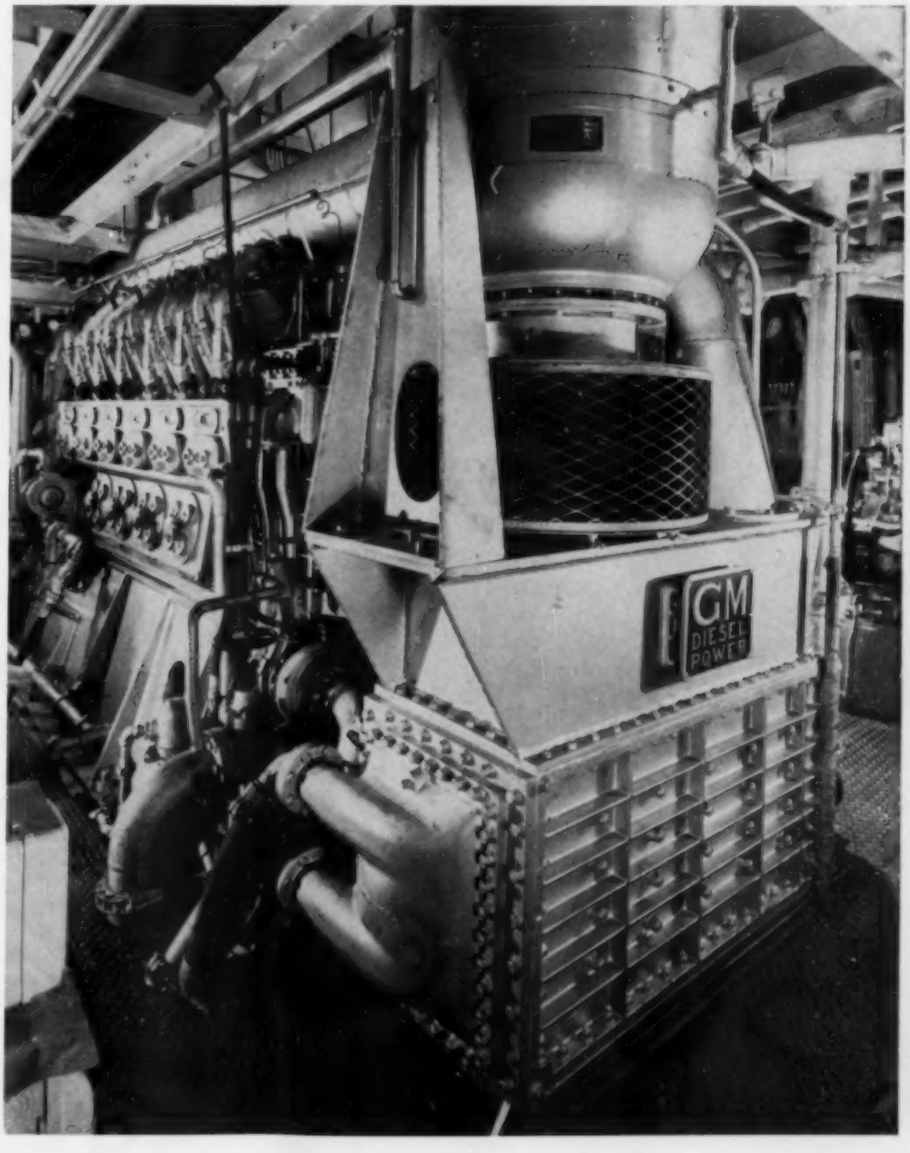
In order to conform to height limitations imposed by bridges over the canal, the pilothouse is retractable with a Joyce-Cridland Company's 7 ft lift hydraulic ram. The two masts carrying towing lights and range light fold down, the exhaust stack is short and squat and the life boat is chocked close to the deckhouse under low davits, the whole boat being only a little higher than the boat deck rails. Hull and superstructure are, of course, welded steel throughout. The boat was built to ABS classification by the Calumet Shipyard & Dry Dock Co. of Chicago. Depth of hull at side amidships is 11 ft 2⅝ in., which is a little less than boats of this type operating exclusively on salt water. The form is conventional and despite the heavy power, the main engine does not rise into the upper engineroom. This is an advantageous feature contributing to better utilization of the available space within the deckhouse extending well forward and aft because some of this space is essentially assigned to the retractable pilothouse. Access to all living quarters throughout the vessel are arranged without going outside. Mahogany trim is extensively employed. All exterior plating is heavily insulated with fiber glass and the interior is sheathed for attractive livability.

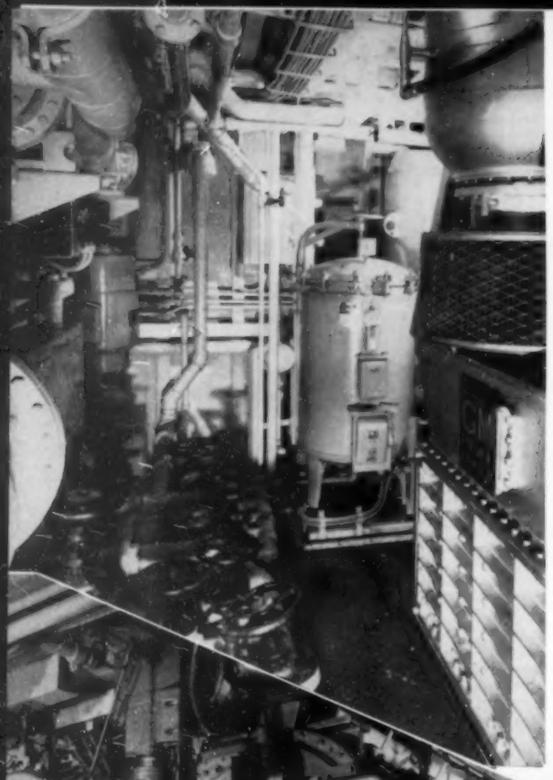
The main engine is of prime interest for several reasons. One of which is installation of so much power in hull dimensions somewhat smaller than tugs of considerably less power without over crowding the available machinery space limited somewhat by utilization of the under-deck area for crew accommodations forward. At the same time it provides ample fuel and ballast tank capacities ahead and abaft the engineroom proper. As announced by Thomas E. Hughes of the Cleveland Diesel Engine Division of General Motors, the engine is an intensive development of the 2-cycle line. The 498 series is available in 8, 12 and 16 cylinder models all with a bore of 8¼ in. and stroke of 10½ in. and the maximum power rating is 175 hp per cylinder. He says four distinct advantages are lower initial installation costs per hp, lower operating costs because of high efficiency and much lower maintenance expense per hp. Compared with a non-turbocharged engine, it develops 60 per cent more horsepower per cubic ft of engine volume and the exhaust driven compressor in series with the engine driven positive displacement blower; acceleration is exceptionally good with a clear exhaust. At rated speed the fuel consumption is 0.36 lb per bhp hr and 0.38 lb per hp hr at 50 to 100% of horsepower range.

In the matter of lube oil consumption, Mr. Hughes further declares that 6000 hp hrs per gal. is revealed at rated power. Incidentally, on the *Spartan* a Honan Crane oil filter is used. A thermal efficiency of 36 per cent has been achieved by turbocharging. No appreciable torsional vibrations have been revealed over the entire operating range. In view of the fact that the design characteristics of the components have already been presented in DIESEL PROGRESS a review of these seems unnecessary at the moment.

As installed in the *Spartan*, the 12-cylinder unit is equipped with a Falk Airflex combined reverse and reduction gear. It drives a 3-bladed manganese bronze propeller of 8 ft 6 in. diameter through a reduction gear ratio of 3:1. Speed control is through the medium of a Marquette governor. The conventional Ross heat exchanger installation is used in the closed fresh water cooling system and another conventional installation is the Maxim exhaust silencer. Salt water connections are made with Aeroquip hose. The shaft is carried in Babbitted bearings in an oil filled stern tube sealed with Cedervall seals. Auxiliary power is supplied by a pair of Detroit General Motors diesels, Model 3-71 driving 30 kw Delco 120 volt dc generators, with a Calumet Shipyard & Dry Dock Co. main switchboard and a 56-cell Exide battery set. A shore connection is also provided. This is a floating battery system with Safety Industries carbon pile regulators. Heat is provided by a Kewanee oil fired steam boiler and Trane converters. There is a hot water take-off from the heating system. The

Front end and starboard side of the main engine reveals the remarkably compact arrangement of the De Laval supercharger and after-cooler installation. Weight and bulk of machinery are not increased in proportion to the power increase resulting from turbocharging.





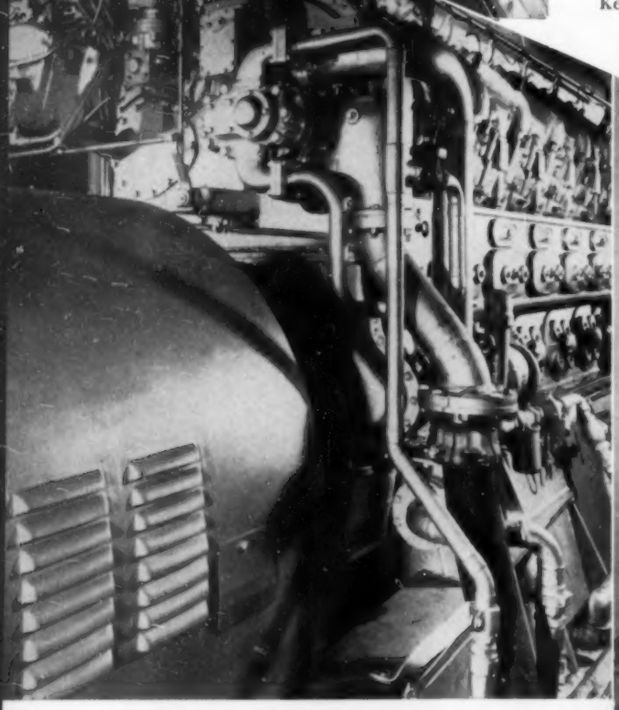
Athwartship view at the front of the main engine reveals valve manifolds for piping system and the Honan Crane lube oil filter.

is a metal faced work bench with the conventional arrangement for tools and stowage of maintenance supplies. There are six main fuel tanks, three under the forecastle, P & S deep tanks ahead of the engineroom and an after peak tank. Fresh water is carried in two tanks in the lazarette of 825 gal. capacity each supplemented by a 850 gal. tank forward giving a total of 2500 gal. Tankage is provided for 400 gal. of lube oil. Compressed air for starting and operation of the clutches is carried in cylinder tanks 18 x 60 in. Ingersoll-Rand compressors keep them charged. Mechanical ventilation for the living quarters is provided by an American Blower Co. 3400 cfm blower.

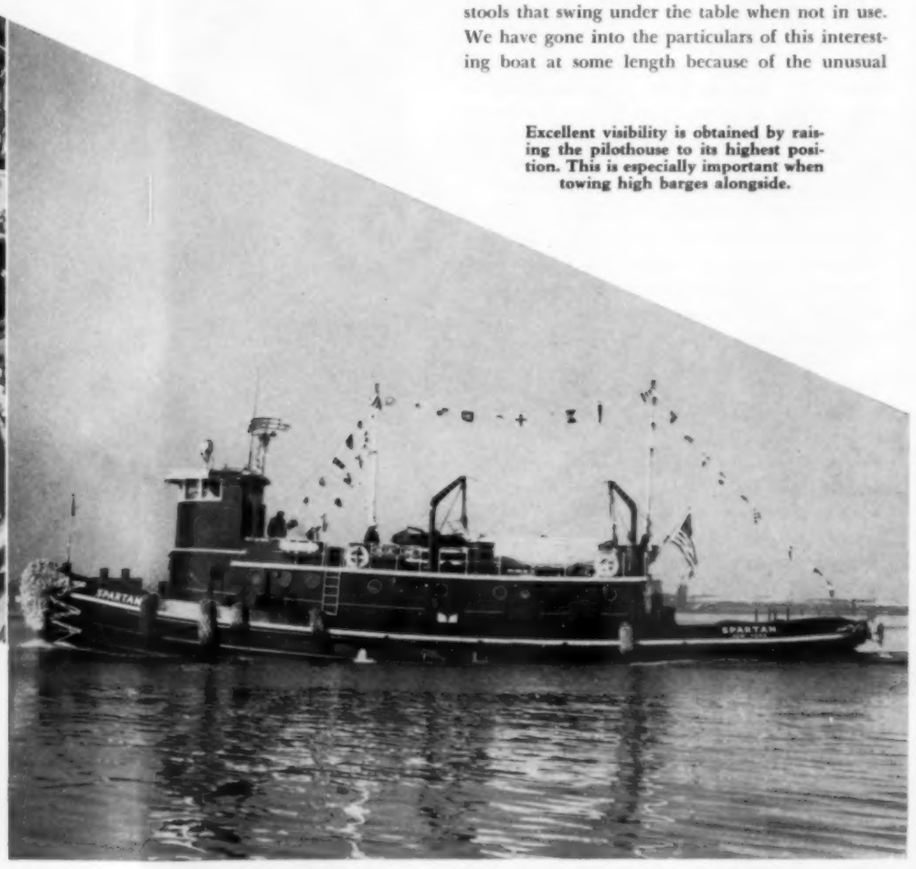
On deck the *Spartan* is well equipped. She has one of the new Model Sperry hydraulic steering units with steering control of the same make. Power control is through the medium of Lake Shore equipment. In both instances controls are also installed atop the after end of the deckhouse. There is a Sperry Master Gyro, Mark 18, Model 4-A and a Kelvin & Wilfred O. White 7 in. constellation

the pilothouse and a proper arrangement of Perko running lights including head light above the visor in the middle of the pilothouse. Deck equipment of kevels and bits is not unusual. A 400 lb Danforth anchor is carried. On the bow deck are two deck line lockers and pine grating. Aft, in addition to heavy towing bits, there is a 20 hp Benson Electric (Almon Johnson) electric gypsy with 24 in. diameter whelps for handling 10 in. circumference towing hawsers.

A very trim exterior has been achieved by extending the deckhouse structure far enough forward to shroud the space vacated by the pilothouse in raised position. Despite the foreshortened interior space four comfortable staterooms of ample proportions are arranged forward of the upper engineroom. One of these is for the master, one for the chief engineer and the other two with double berths are for the mates and assistant engineers. Crew quarters are provided in a forecastle under the pilothouse. There is a shower and a toilet on each side of the upper engineroom. A combination galley and mess room aft is fully equipped with built in combination refrigerator and deep freeze compartments served by Frigidaire refrigerating machines. The range is a Webb oil burning unit. Stainless steel trim is used extensively. The galley table built over lockers can seat five men on hinged stools that swing under the table when not in use. We have gone into the particulars of this interesting boat at some length because of the unusual



Starboard side looking forward shows the 12-cylinder General Motors turbocharged diesel hooked up to the Falk Airflex reverse and reduction gear. Note Marquette Governor in upper left hand corner.



Excellent visibility is obtained by raising the pilothouse to its highest position. This is especially important when towing high barges alongside.

three water system pressure sets are Roth 300 gph units with 18 x 36 in. tanks, for ample storage.

Ample provision is made for machinery maintenance. Lifting rail for securing ½ ton chains hoists are installed over each bank of cylinders and there

spherical compass. The *Spartan* is also equipped with a Decca radar, RCA ship to shore telephone, and the latest model RCA radio direction finder of the fixed loop type. Pilothouse windows are Kearfott spring balanced. There is a 20 in. Rayolite searchlight and Leslie Tyfon whistle on top of

amount of power in a comparatively small hull. In discussing the high power we asked Mr. Kellers whether the boat is over powered for some of the tows which it is intended to handle. He said he could foresee no such difficluty as the captain will have this power well under control at all times.

JERSEY CITY'S NEW THIRTY-EIGHT MILLION DOLLAR SEWAGE SYSTEM

SOMETIME this month, it is planned to start the West Plant of the new Jersey City's sewage treatment system, which is well illustrated on this and the following two pages. Figure 1 gives you the general location of Jersey City in relation to Manhattan on the East and Newark on the West. This new sewage system will treat the 100,000 lbs of raw sewage solids presently being poured out daily from 42 drainage areas into Jersey City's adjacent rivers and bays. The intercepting sewers will collect this sewage and transport it to the treatment plants. At each point of interception, an intercepting chamber is provided that will automatically intercept the entire sewage flow during dry weather and an increased quantity during storms. As the existing sewers carry both domestic sewage and storm water run-off, the excess flow during storms will be bypassed through the existing outlets. Because of the locations of the plant sites on the east and west sides, all flow through the intercepting sewers is by gravity. At each plant the collected sewage is pumped and then flows through the plant and outfall by means of gravity.

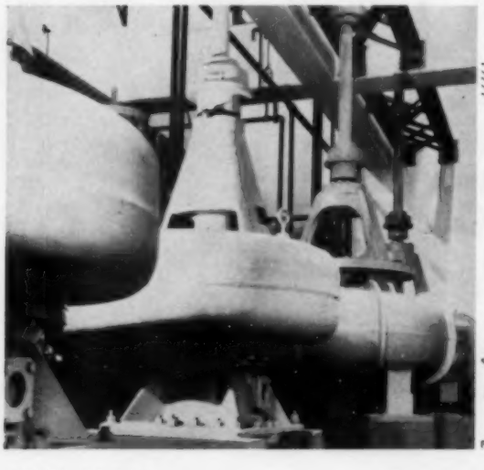
Fig. 3 is the flow diagram of the East Side treatment plant. Fig. 4 is a flow diagram of the West Side treatment plant. Each plant is provided with chlorine handling and feeding equipment for the use of ton containers of chlorine. Facilities are provided for pre-chlorination for odor control and post-chlorination for sterilization of the effluent. The required detention period for the effective action of the chlorine on the effluent is provided by a chlorine detention tank at the West Plant and a long outfall at the East Plant. Fig. 5 shows that at each plant, mechanically cleaned screens and grit chambers precede the pumps. The pumped sewage is metered by a Venturi meter at the West Plant and a Parshall Flume at the East Plant. It then discharges to the influent channel of the sedimentation tanks.

Each sedimentation tank is preceded by mixing tanks with air agitation which will increase the effectiveness of the sedimentation tanks by natural flocculation and by distributing the flow over the sedimentation tank cross section to prevent density and temperature currents. The sedimentation tanks are equipped with scum and sludge removal equipment to collect the floating and settled solids.

At each plant, fresh solids are withdrawn from the tanks by pneumatic ejectors which permit the removal of sludge at a low controlled rate. Collected fresh sludge from both plants is pumped to the sludge concentration tanks at the West Plant. Clyde Potts Associates were the Consulting Engineers on this project. Vernon Lynch was the resident engineer.

The West Plant consists of five main structures: (1) the Administration Building (2) the Operations Building (3) four digestion tanks and gallery (4) five sedimentation tanks and gallery (5) the

At the West Plant four Worthington vertical centrifugal pumps are used to handle the 36 mgd average daily flow. Maximum capacity of the West Plant is 84 mgd. Worthington also supplied the four main pumping units at the East Plant which operates at 46 mgd average daily flow. Maximum capacity of the East Plant is 128 mgd. All pumps are driven by synchronous motors. The two in the foreground are powered by magnetic drives giving variable speed. The two units in the rear are constant speed.



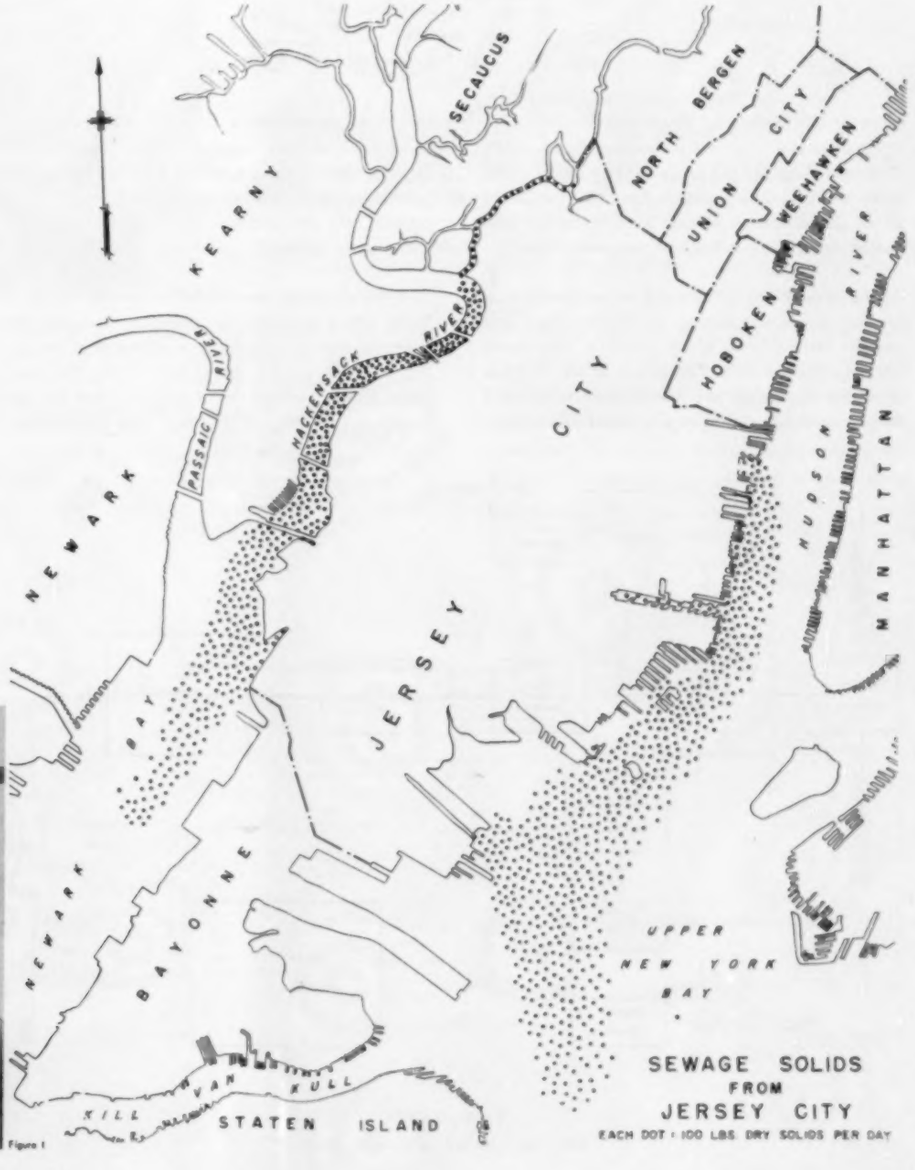
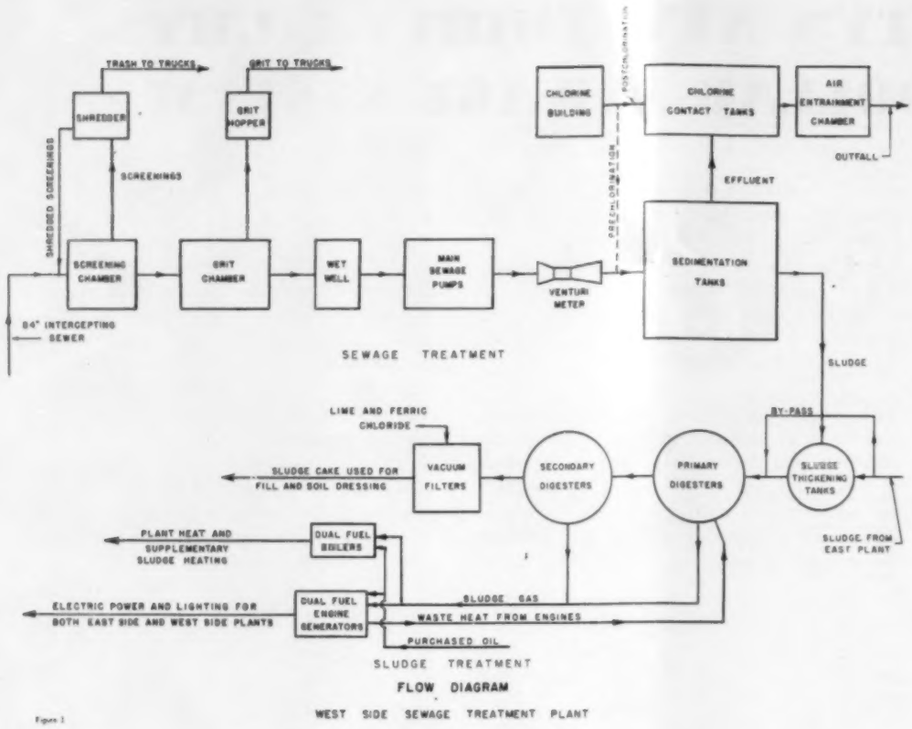


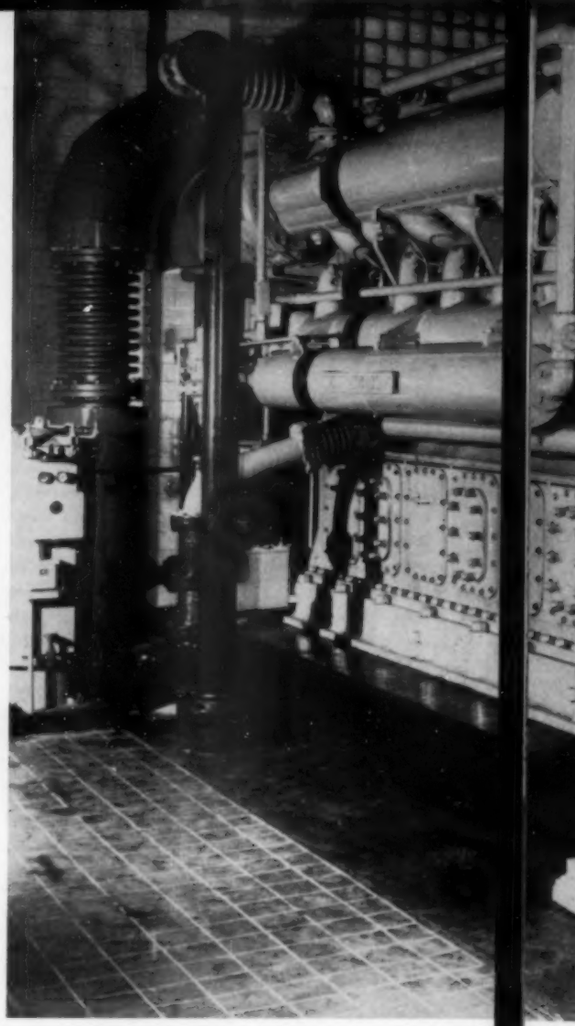
Figure 1



FLOW DIAGRAM

Figure 3

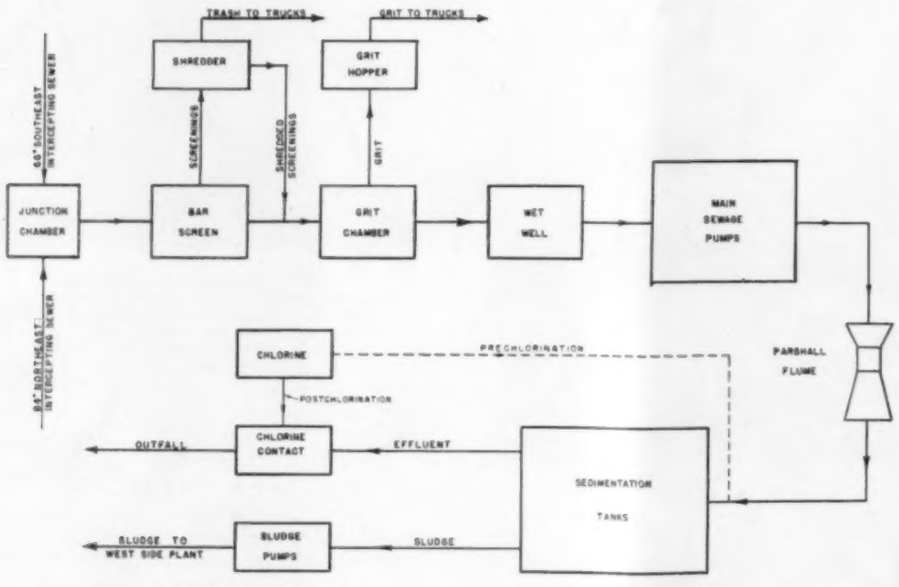
WEST SIDE SEWAGE TREATMENT PLANT



Chlorine Building. The East Plant consists of an Operations Building and six sedimentation tanks. Constructed on the site of an old city dump across from the Federal Shipyards in Kearny, New Jersey, all of the structures of the West Plant are supported on 5,000 cast-in-place concrete piles.

At the West Plant a Worthington automatic float control eliminates surging in the wet well and permits more efficient plant operation than standard step-type controls. Comprised of an electrical switching apparatus, the float control is actuated by gears through means of a sprocket and a chain and float combination. The Worthington float control differs from most other float controls because it enables the pump flow rate to the various process units to always equal the rate of flow coming into the station by varying the speed of the pumps gradually and uniformly.

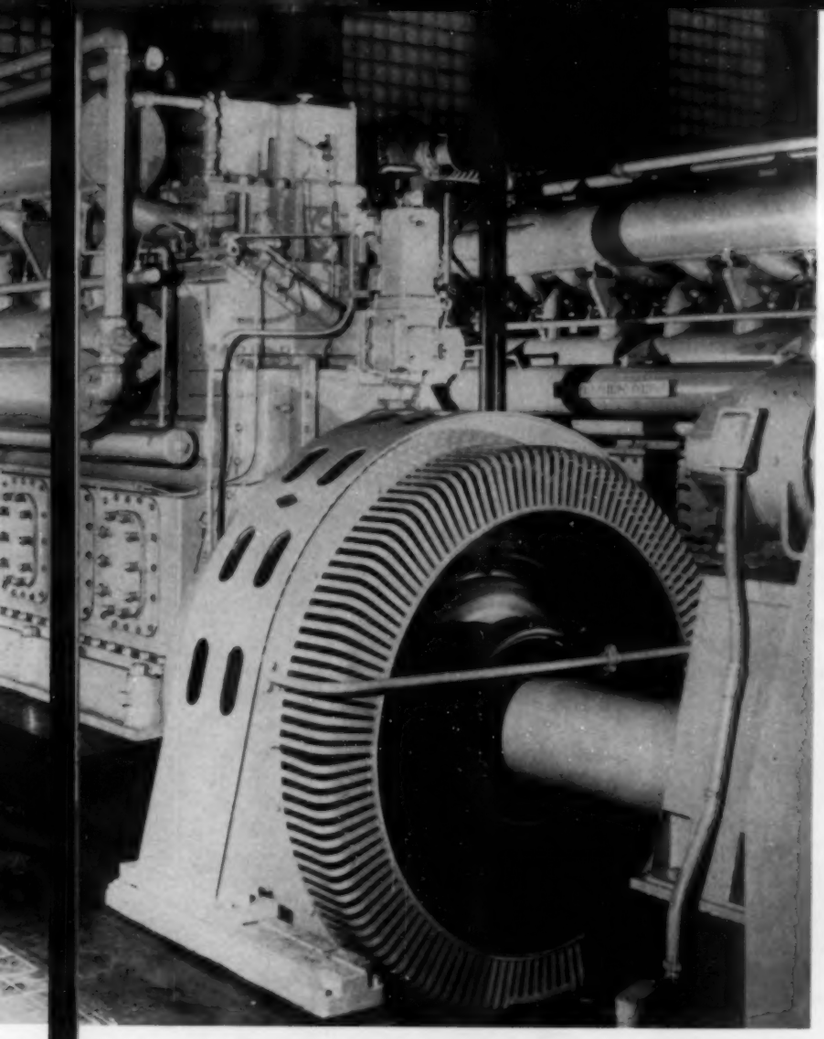
The Worthington engines are located in the West Plant which contains the necessary facilities for digesting and dewatering the sludge and collecting the resultant gas for use as fuel in the dual-fuel units. Sludge gas can also be used as a fuel for the boilers which will supply plant heat and supplemental sludge heating. In addition to the main pumping units and engines, Worthintgon also supplied 3 vertical turbine and 3 centrifugal pumps for pumping effluent water to the chlorinators; 1 vertical centrifugal sludge pump; 4 oil pumps; 3 horizontal centrifugal jacket water pumps; 2 gas compressors and 2 air compressors.



FLOW DIAGRAM

Figure 4

EAST SIDE SEWAGE TREATMENT PLANT



Power for both the West and East Plants is supplied by three Worthington dual-fuel engines with direct connected Electric Machinery generators. Total output of these units are 2079 kw.

One of the outstanding features of this fine engine installation is the completeness of the accessory equipment incorporated into the layout. Electric Machinery generators and exciters so noticeable in the illustration above; Elliott-Buchi turbochargers; Woodward governors; Alnor pyrometers; a Hilco continuous by-pass lube oil filter; Sims shell and tube lube oil coolers; Sharples lube oil centrifuge; Air Maze air intake silencers; Maxim exhaust silencers with inbuilt waste heat recovery units for heating the hot water requirements of the plant; American Air Filter panel type air filters; Detroit Controls system of automatic shut down equipment and last but not least the lube oil used in these three engines is Texas Ursa.

PLANT UNITS

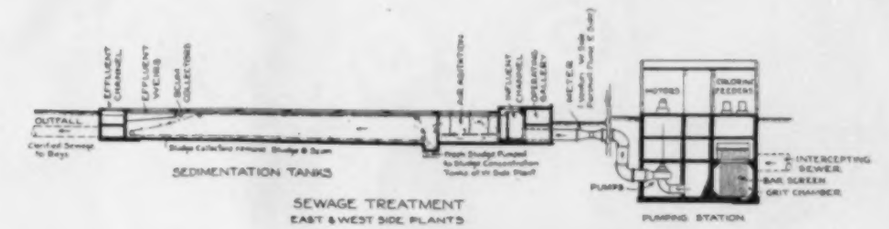
	East Plant	West Plant
Plant Capacity		
million gallons per day	46.62	36
Raw Sewage Pumps		
	2-32 mgd-250 HP 2-64 mgd-500 HP	2-25 mgd-150 HP 1-40 mgd-300 HP 1-50 mgd-350 HP
Sedimentation Tanks		
Number of Tanks	6	5
Length of Tanks	160 ft.	150 ft.
Width of Tanks	66' - 6"	66' - 6"
Depth	14 ft.	14 ft.
No. of longitudinal collectors in each tank	4	4
No. of cross collectors in each tank	1	1
Retention period - hours	3	3
Sludge Concentration Tanks		
Number of Tanks	-	2
Diameter - feet	-	40
Depth - feet	-	35
Sludge Digestion Tanks*		
No. of Tanks	-	4
Diameter - feet	-	100
Depth Wall - feet	-	32
Power		
Engine & Generators	-	3
Engine - Type		Dual-fuel Diesel
Horse power		990
Generators - KW (0.8 P.F.)		690
" - voltage		4160

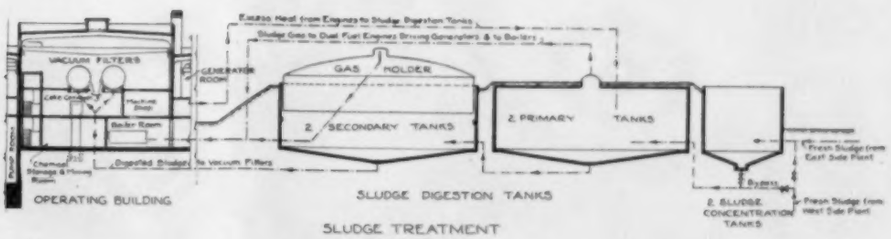
* Two of the digestion tanks have fixed covers and mixers for circulating the sludge and the other two tanks have floating gas holder covers which will store the collected gas.

Four 11½ x 13' spring type vacuum filters in the Operating Building will be used for drying the Digested Sludge which will provide an excellent soil dressing.

This table supplies you with the plant units in each of the two plants.

Front view of the West Operations Plant. The West Plant is one of two operating buildings in Jersey City's new sewage treatment system.




Excess Heat from Engines to Sludge Digestion Tanks
Sludge Gas to Dual Fuel Engines Driving Generators & to Boilers
VACUUM FILTERS
GENERATOR ROOM
GAS HOLDER
2 SECONDARY TANKS
2 PRIMARY TANKS
Boiler Room
Chemical Storage & Mixing Room
Digested Sludge to Vacuum Filters
Fresh Sludge from East Side Plant
OPERATING BUILDING
SLUDGE DIGESTION TANKS
2 SLUDGE CONCENTRATION TANKS
From Sludge from West Side Plant
SLUDGE TREATMENT
WEST SIDE PLANT

PLANT PROFILES
JERSEY CITY, N. J.

ALISA V

By ED DENNIS

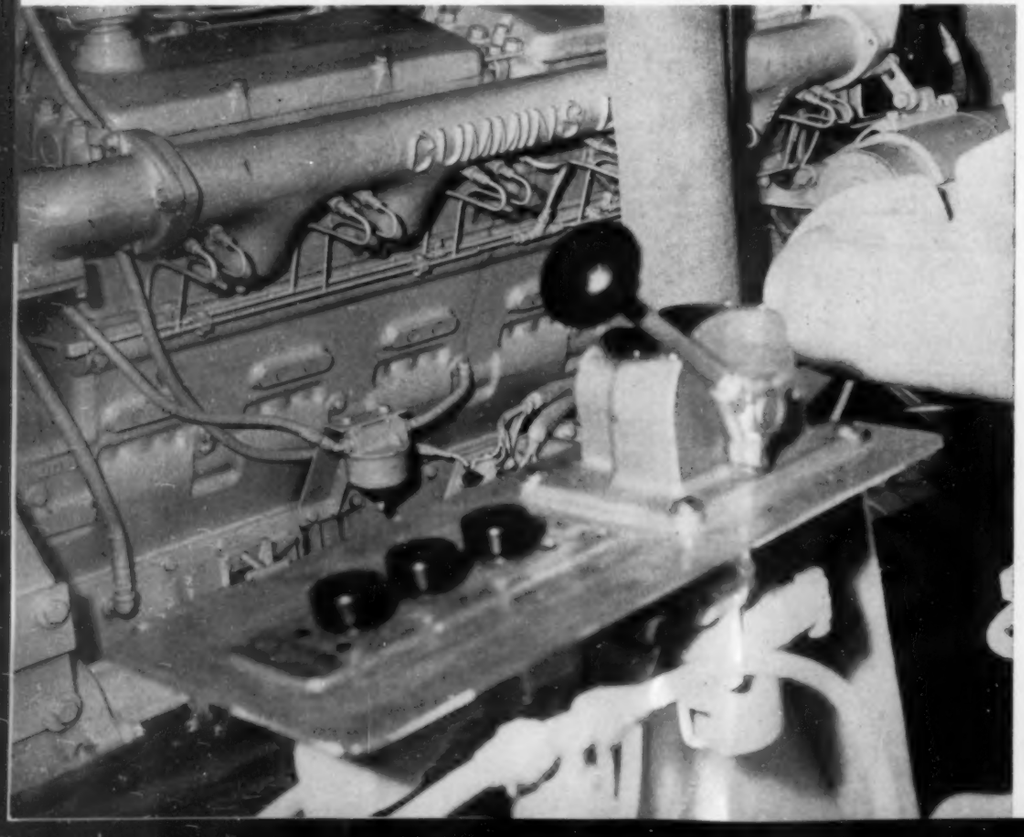
One Of The Largest Yachts Built Since 1945, Naturally Driven By Diesel Engines. This Fine Looking Ship Is a Credit To Its Designer and Builder.

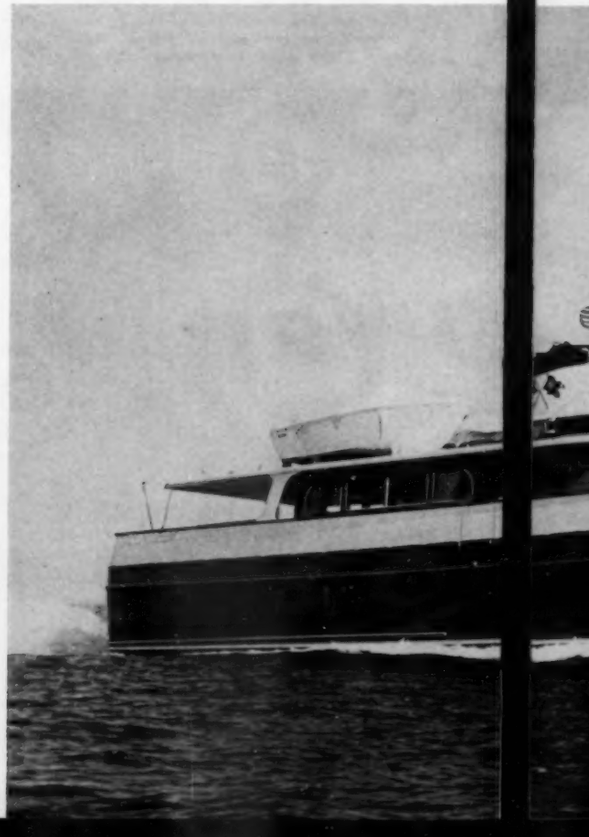
SLEEK and streamlined, the *Alisa V*, asserted to be the largest and most luxurious yacht built in the United States since World War II. This 96 twin screw Cummins dieselized yacht cost an estimated half a million dollars and is the latest word in luxury afloat. The *Alisa V* was designed by John H. Wells, naval architect of New York, using the experience gained in designing over 1500 vessels, they incorporated maximum comfort and convenience plus safety at sea. Built by Broward Marine Inc. of Ft. Lauderdale Florida, for Mr. Elmer H. Bobst, Chairman of the Board of Warner-Lambert Pharmaceutical Co. Powered by two model VT12-M Cummins diesel engines, the *Alisa V* has a cruising speed of 14 knots at 1800 rpm.

This craft was the first large yacht built of wood using the laminated construction method developed by the United States Navy. Each glued joint was tested for breakage before setting it in place. The keel is in one piece from head of stem to transom. The frames are also in one piece incorporated from sheer on one side to the other in one continuous piece. Keel fastenings, stringer fastenings and planking screws are of silicon bronze. The planking is double thickness Philippine mahogany, laminated and glued without butt blocks. Impressive as a yacht, it is the interior of the *Alisa V* that gives it distinction, as it is the ultimate in luxurious living afloat. On the main deck there is a large after lounge. Approximately 20 feet by 17 feet, it is fitted with regular nautical furniture and removable flexible screens.

As the owner, Mr. Elmer Bobst, likes a vessel that is as comfortable as a home, yet run like a deluxe first class hotel, the *Alisa V*, among other things, is air conditioned. The pilot house is equipped with the latest radar gear and high precision navigational equipment including long distance telephone, depth recorder and other mechanical perfections. The living and dining rooms, are finished in such exotic woods as, Australian walnut, Brazilian rosewood and Avodire. The oil paintings are specially fitted to the different rooms. The decorating and furnishings were done by the firm of Fellheimer and Wagner of New York City.

The galley has a standard 40 cubic foot refrigerator and all the latest galley equipment includ-

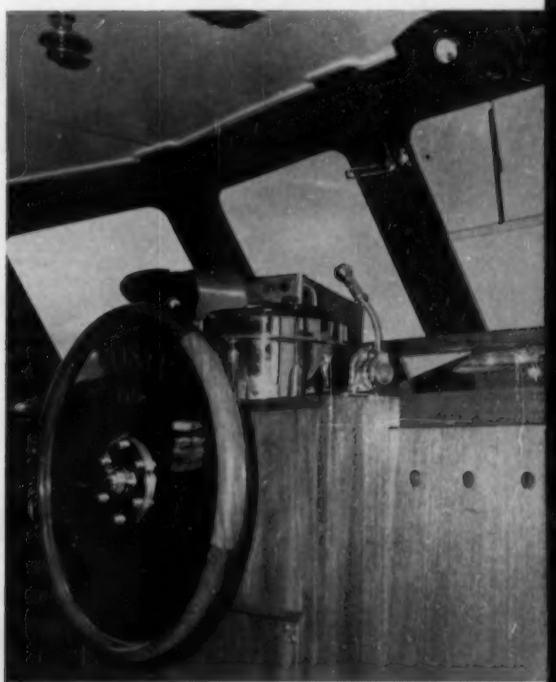




ing a 72 cubic foot deep freeze. Mr. Bobst is a connoisseur of fine foods and the freezer will carry 700 pounds of such delicacies as guinea hen, grouse, filet mignon and frogs legs so that the vessel can serve a full course dinner at any time and any where. Below decks is the owner's suite with specially built furniture and twin beds plus two other spacious staterooms. Each is equipped with private bath with 24K gold plated dolphin shaped water fixtures. The main deck is of teak, the deck houses of Honduras mahogany.

Structurally, the *Alisa V* is the strongest wooden vessel of her size that has been built and with its draft of 6 foot 8 inches, it is particularly suited for Caribbean waters and the inland water ways. Propulsion is provided by two model V. T. 12 M Cummins 4 stroke cycle turbocharged diesel engines. The 12 cylinder engines have a 5⅛ in. bore and a 6 in. stroke and deliver a continuous 425 horse power at 2100 rpm. Snow Nabstedt 2.9:1 reduction gears give the vessel a cruising speed of 14 knots at 1800 rpm and an expected top speed of 16 plus. Fuel consumption while cruising is 52 gallons per hour for both main diesels and the 15 kw generating set. Two electric generating sets are used for lighting and power. One a 15 kw and the other a 35 kw, both Kohler generators powered by Waukesha diesel engines. Batteries are used only for starting the engines as the vessel is wired for 110/220 volt and has ship to shore connections. Water tanks and piping are of silicon bronze, Navy standard, with a capacity of 3200 gallons. The steel fuel oil tanks have a capacity of 4000 gallons, which is sufficient to permit the vessel to cruise to the Mediterranean, as is planned.

Nothing has been omitted in the construction of the *Alisa V* to make it a dependable seagoing vessel of relatively high speed and still incorporate maximum comfort and convenience.



EASTON, MARYLAND

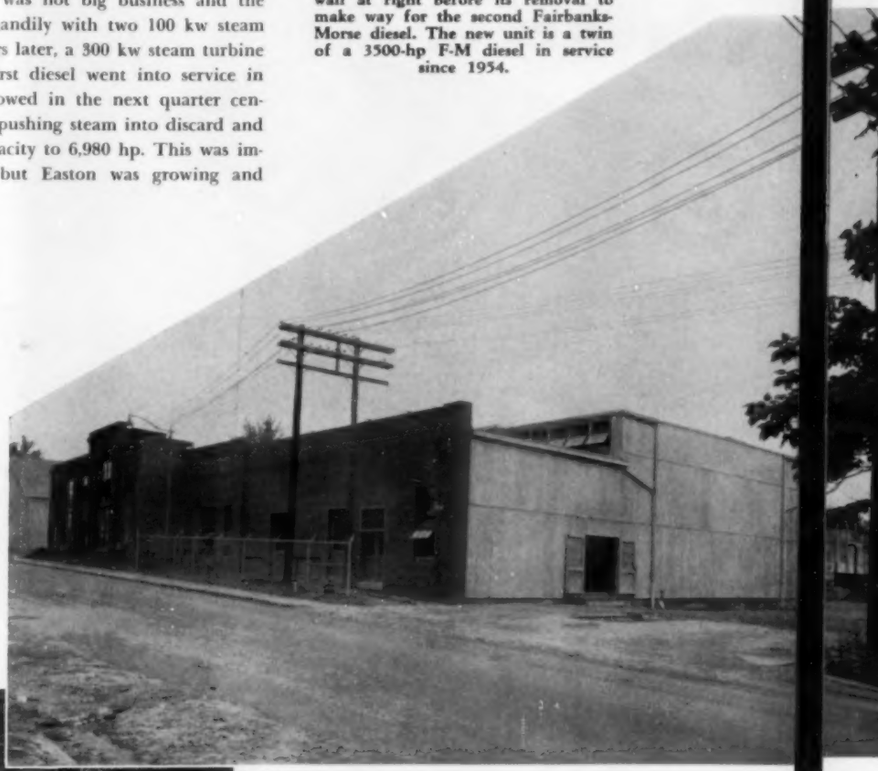
Maryland Community On The Eastern Shore Adds Two 3500 Hp Fairbanks-Morse Engines To Meet Growing Demand, Promote Efficiency.

By DOUGLAS SHEARING

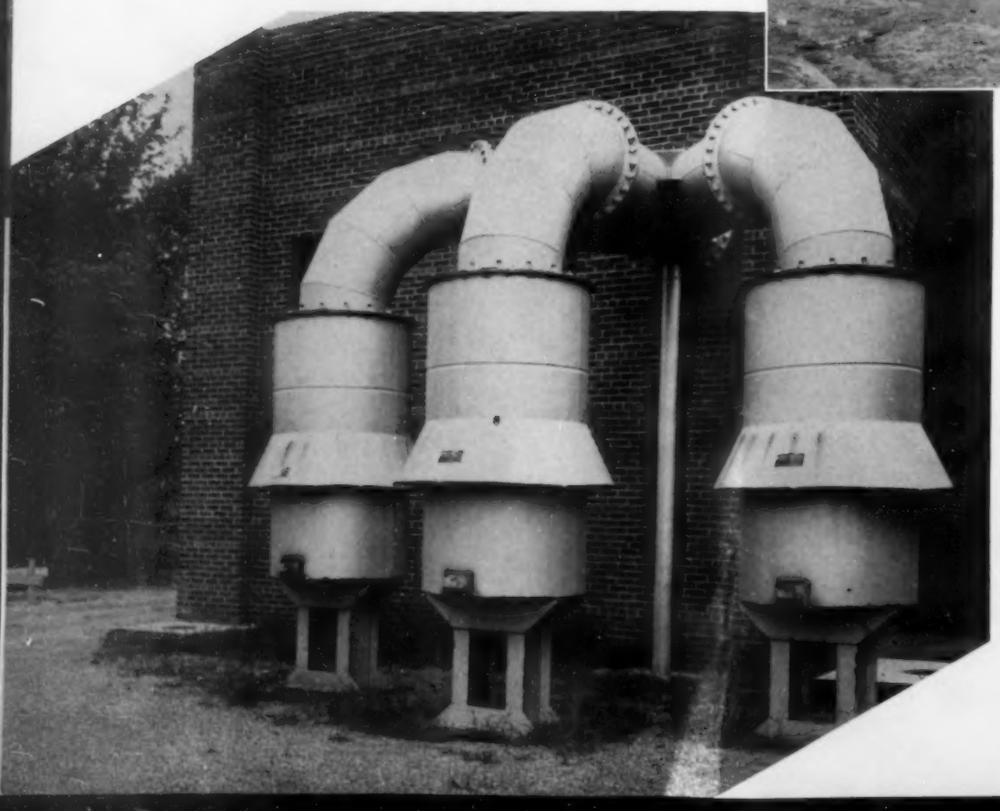
THERE is a gracious Colonial flavor to Easton, historic old town on Maryland's Eastern Shore, but the home comforts and the methods in business and farming are as modern as tomorrow. You can still attend religious services in Third Haven Meeting House, old frame church built in 1682 that once resounded to a sermon by William Penn. They still conduct Talbot County business in the old brick court house, built by order of the Colonial Legislature in 1710 as the "East Capital of Maryland." But the colonial house is likely to have air conditioning and an electric kitchen and the farmer has milking machines and electric brooders. Source of this electric power for modern living is the Easton municipal power plant which never has failed to anticipate growing demand and today is in the midst of its greatest expansion program. Completion of this program will give the city two 3500 hp Fairbanks-Morse diesels, a pair capable of carrying the peak loads on the plant with substantial improvement in efficiency.

Municipal operation goes back to 1915 when the city took over from a private utility company that was in financial difficulties. Provision of electric power for Easton was not big business and the load was carried handily with two 100 kw steam engines. Seven years later, a 300 kw steam turbine was added. The first diesel went into service in 1927 and was followed in the next quarter century by five more, pushing steam into discard and bringing plant capacity to 6,980 hp. This was impressive progress, but Easton was growing and sharing in the vastly increased popularity of electric appliances, and progressive management knew that major plant expansion was imperative. In November, 1954, the city installed the plant's biggest diesel, a Model 31A18 Fairbanks-Morse two-cycle unit rated at 3500 hp at 277 rpm. January, 1955, found the big engine on the line carrying a major portion of the load. Recently, another identical diesel has been installed. The pair of engines more than double the previous size of the plant, raising capacity from 6,980 hp to 13,980 hp.

Unquestionably, the city was influenced in its choice of a second 3500 hp F-M diesel by the performance record of the first unit. In 1955, the new engine produced 10,192,400 kw hrs of the plant's total output of 17,853,500 kw hrs. In the first six months of 1956, the diesel continued to turn out more than half the plant's total production, 4,900,800 kw hrs out of 9,180,800 kw hrs. Dependable, high-volume production was important, but production economy was another major consideration. Through July, 1955, fuel consumption records show only plant totals, but from August on there are separate meter readings recording for the big engine. In the 11-month period from August 1955 through June 1956, the F-M diesel generated 9,031,900 kw hrs. Fuel consumption was 657,987 gal. for an average of 13.72 kw hrs per gal. In 1954, the year before the F-M unit went into service, plant output was 15,749,300 kw hrs on 1,253,872 gal. of fuel, an average of 12.56 kw hrs per gal. Six days a week the big engine starts operation at 7 a.m. and runs steadily until about 10 p.m. Sometimes the unit is called on for Sunday service too.



This view of the power plant at Easton, Maryland, shows the temporary wall at right before its removal to make way for the second Fairbanks-Morse diesel. The new unit is a twin of a 3500-hp F-M diesel in service since 1954.

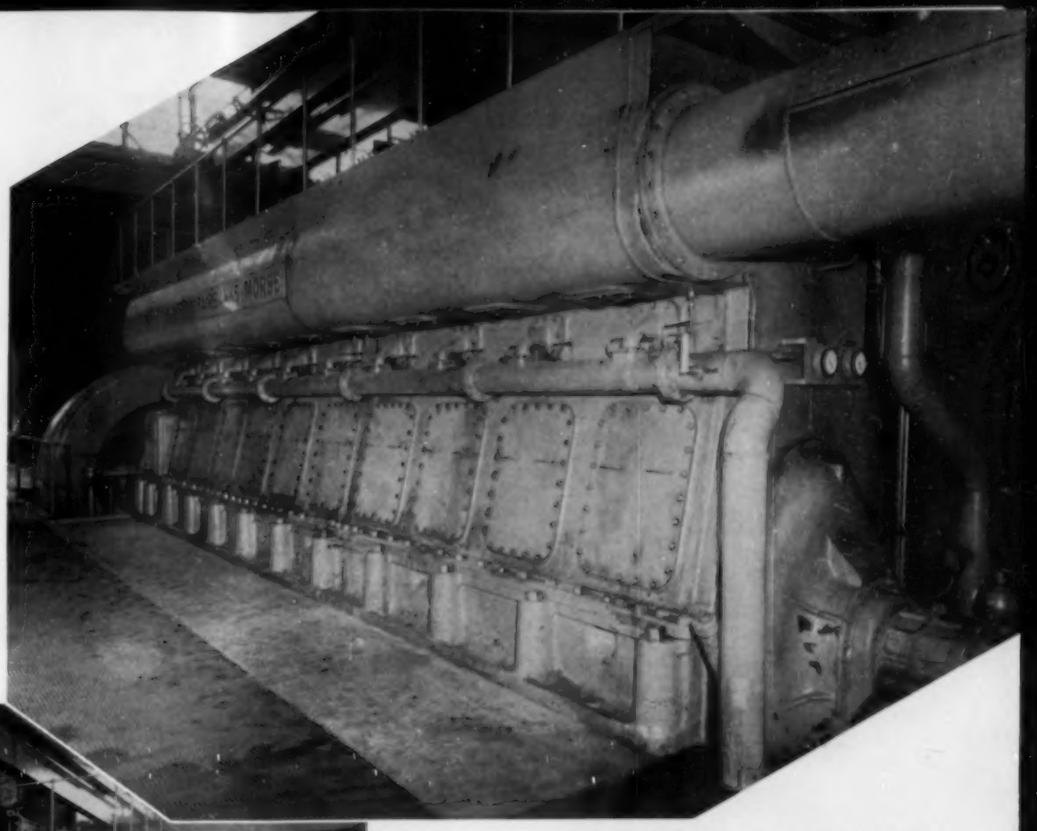


Air for the 3500-hp Fairbanks-Morse diesel is drawn through these three oil bath filters at the rear of the Easton plant. From these American Cycoil filters, air passes to the Roots-Connersville blower.

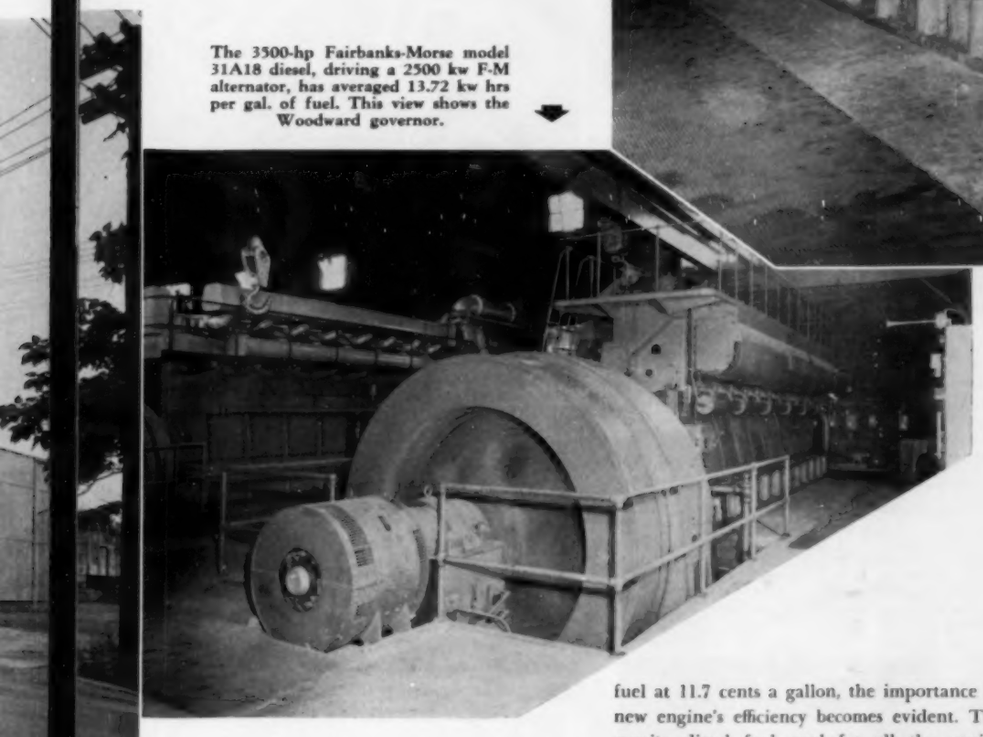
The engine goes on the line at the start of the peak period which normally runs from 7 in the morning for five or six hours. These peaks, which reached 4100 kw in 1955 and rose to 4500 kw this past summer, pile a solid commercial activity on top of the domestic appliance load.

Easton is the county seat and the trading center for a rich agricultural area where wheat, corn, soy beans and poultry are grown. The city's plant carries a good deal of rural load on lines that extend as much as 18 miles into the countryside. Harvest time brings heavy electrical demand as the farmers bring crops in to Easton's canneries and elevators. Agriculture holds top position as a revenue producer for the region, but second place goes to fishing, processing and distribution of seafood. Talbot County has nearly 600 miles of waterfront with Chesapeake Bay on the west and south and five rivers probing deep into the county. Both commercial and recreational boating contribute to Easton's prosperity and add to the city's population of 6,800. The power system has been prosperous too, paying its own way through the expansion program and returning sizeable profits to the city. In 1955, the Electric Department had a total income of $486,557.36. Expenses for electric generation were $229,084.47, for distribution $39,122.97, accounting $9,958.73, sales promotion $970.74, and administrative and general expense $18,872.23 for a total of $298,009.14. This left an operating profit of $188,548.22. After deduction of $56,573.65 for depreciation reserve and $13,291.66 for interest, there remained a net profit of $118,682.91. The natural gas pipelines have not penetrated the peninsula and Easton is dependent on relatively expensive fuel oil for her diesels. With fuel at 11.7 cents a gallon, the importance of the new engine's efficiency becomes evident. The 38-gravity diesel fuel used for all the engines is brought in by truck and stored in three tanks with combined capacity of 45,000 gal. Oil for the F-M engine is pumped from storage through a meter to a 600 gal. day tank in the plant basement where it is picked up by the engine's own supply pump and sent through a duplex filter to the fuel injection system.

One of the advantages of the Easton plant has been continuity of competent management. Since 1917, just two years after the City took over, the electric department has had the services of Superintendent William Krumbine. The system is operated under the supervision of a three-man Utilities Commission, appointed for six-year terms by the Mayor—currently Mr. Calvin Lomax. Present Commission members are: Mr. C. Albert Matthews, president, Mr. Earl Ewing and Mr. Howard H. Moffett. One of the power users in Easton is a printing plant which is noted for publication of books in many languages. In any language, the diesel plant has meant service and profit to the community.



The 3500-hp Fairbanks-Morse model 31A18 diesel, driving a 2500 kw F-M alternator, has averaged 13.72 kw hrs per gal. of fuel. This view shows the Woodward governor.



Installed in November of 1954, this 3500-hp Fairbanks-Morse model 31A18, 10-cyl., diesel has been the base producing unit in the Easton, Maryland, power plant. In 1955, this heavy-duty engine supplied 10,192,400 kw of the 17,853,500 kw plant total, an impressive 58 percent. At right is the engine-driven lube pump.

List of Equipment

Engine	Fairbanks, Morse 3500 hp, 10 cyl., 277 rpm Model 31A18 diesel
Alternator	Fairbanks, Morse 2500 kw, 277 rpm, 4800-volt 3-phase, 60-cycle, Type TGZO.
Exciter	Fairbanks, Morse Type DGZO, 30 kw, 125-volt, direct-connected.
Governor	Woodward.
Fuel Filters	Nugent.
Lube oil	Cities Service, SAE 40.
Lube Fliter	Fairbanks, Morse
Auxiliary lube pump	Roper.
Lube oil cooler	Ross.
Thermostatic valves	Amot.
Jacket Water Pump	Fairbanks, Morse
Jacket Pump Motor	Fairbanks, Morse
Air filters	American Air Filter.
Blower	Roots-Connersville.
Blower Motor	Fairbanks, Morse
Exhaust silencer	Maxim.
Cooling tower	Binks.
Gauges	Marshalltown.
Pyrometer	Alnor.
Switchboard	Westinghouse Electric
Gauge board	Weaks Engineering

THREE DAMS IN THE HILLS

Water More Precious Than Gold Is the Driving Force Behind the Construction of Tri-Dam Project in California for Irrigation.

By F. HAL HIGGINS

YOU who believe in the old-fashioned rugged western independence and initiative for the solution of local and community problems can give three hurrahs for three big dams that go into service this year. These dams are known as the Tri-Dam Project. The trio are located in the mountains on the Stanislaus River. Two are high up in the middle fork at close to 4,000 and 5,000 ft altitudes. The group of citizens who were finally able to carry out their plans to finance this $52,000,000 project are in the Oakdale and South San Joaquin irrigation districts. They needed more water for irrigated farm lands already in production and for adding additional farm and industrial growth for the future. Their engineering problems had been worked out by 1952, but the arithmetic of financing was tougher. Eventually they came to the decision that the sale of power from their dams was the answer. P.G.& E. agreed to purchase the power for feeding to their transmission lines. Bond markets in 1953 prevented the financing at that date. So it was decided to carry out the job in two stages: the two up-stream dams —Beardsley and Donnells—were started in 1955.

The bid for construction of Donnells and Beardsley reservoirs by Tri-Dam Constructors won at $31,199,850. This joint venture firm is made up of the famed Morris-Knudsen Company, Inc., Boise, Idaho, which is the sponsor; Peter Kiewitt Sons' Co. of Omaha; Macco Corporation, Paramount, Calif.; and Stolte & Co., Oakland, Calif. Like most contractors building dams in California late in 1955, they took their beating in the heavy rains and floods of late December, 1955, but have come back so efficiently with their expert management of skilled labor teamed on the latest and most efficient diesel equipment, that they are running nearly a year ahead of schedule as this is written late in March this year. That means handsome bonus moneys to make up for loss of time and work done before the flood.

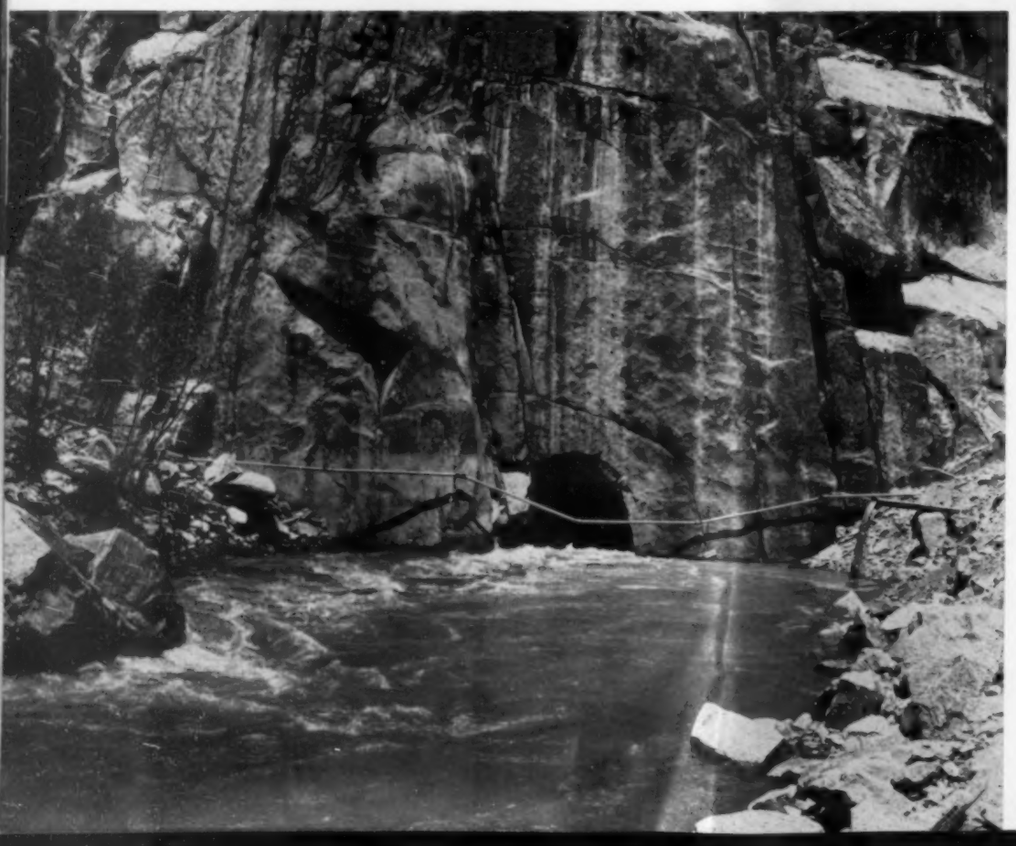
Let experts in tough jobs give you a few ideas about what they had to whip in building Donnells Dam: Said Morrison Knudsen's "EM-Kayan" about this job, "Here is a job that ranks among the toughest. Nearly $400,000 was spent in building roads along the frowning bluffs into the canyon. Far tougher was the task of digging the 197 ft deep wedge-shaped hole for the dam's foundation. Excavation of 244,000 cu yds of material began October, 1955, and was finished in July, 1956. A dragline began the excavation. When it no longer could dig in the deep narrow hole a tractor was lowered by aerial cableway to doze material into a skip. When the hole became too cramped for tractor the last 36 ft was dug by hand to bedrock."

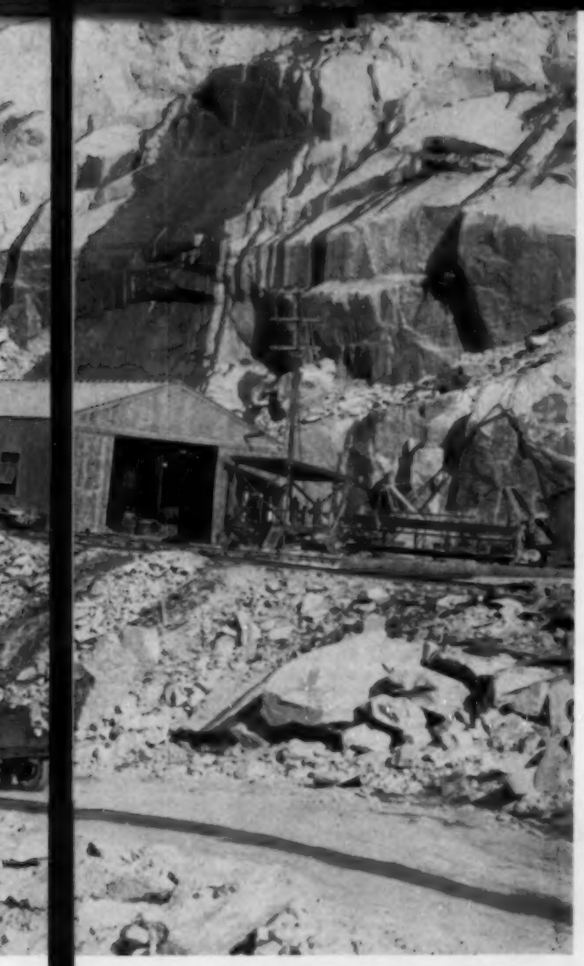
A visit to the Donnells damsite last September proved it is to be a concrete plug in a deep canyon. Sub-contractors were logging timber at the bottom of the canyon to make way for the dam. The logs had to be passed through a tunnel after the trees were felled in this operation. Diesel tractors and trucks were working on this job when seen here, and to see a truck load of logs climb the mountain road out of the canyon was worth watching. On some of the steep "Devil's Elbow" turns the truck would have to stop and maneuver back and forth several times before getting the long logs and truck trailer around the steep reverse curve.

Donnells Dam will have a height above bedrock of 477 ft with only 290 ft seen above stream bed. Some 175,000 cu ft of concrete is going into its construction. Reservoir will be three miles long and cover 425 acres at full-pool level, storing 64,500 acre-feet of water. A tunnel 7.14 miles in length leads from reservoir down stream to a steel penstock 81 in. in external diameter and 2600 ft long, which will drop the water 1200 ft to the power house where it will spin a turbine driving a 54,000 kw generator.

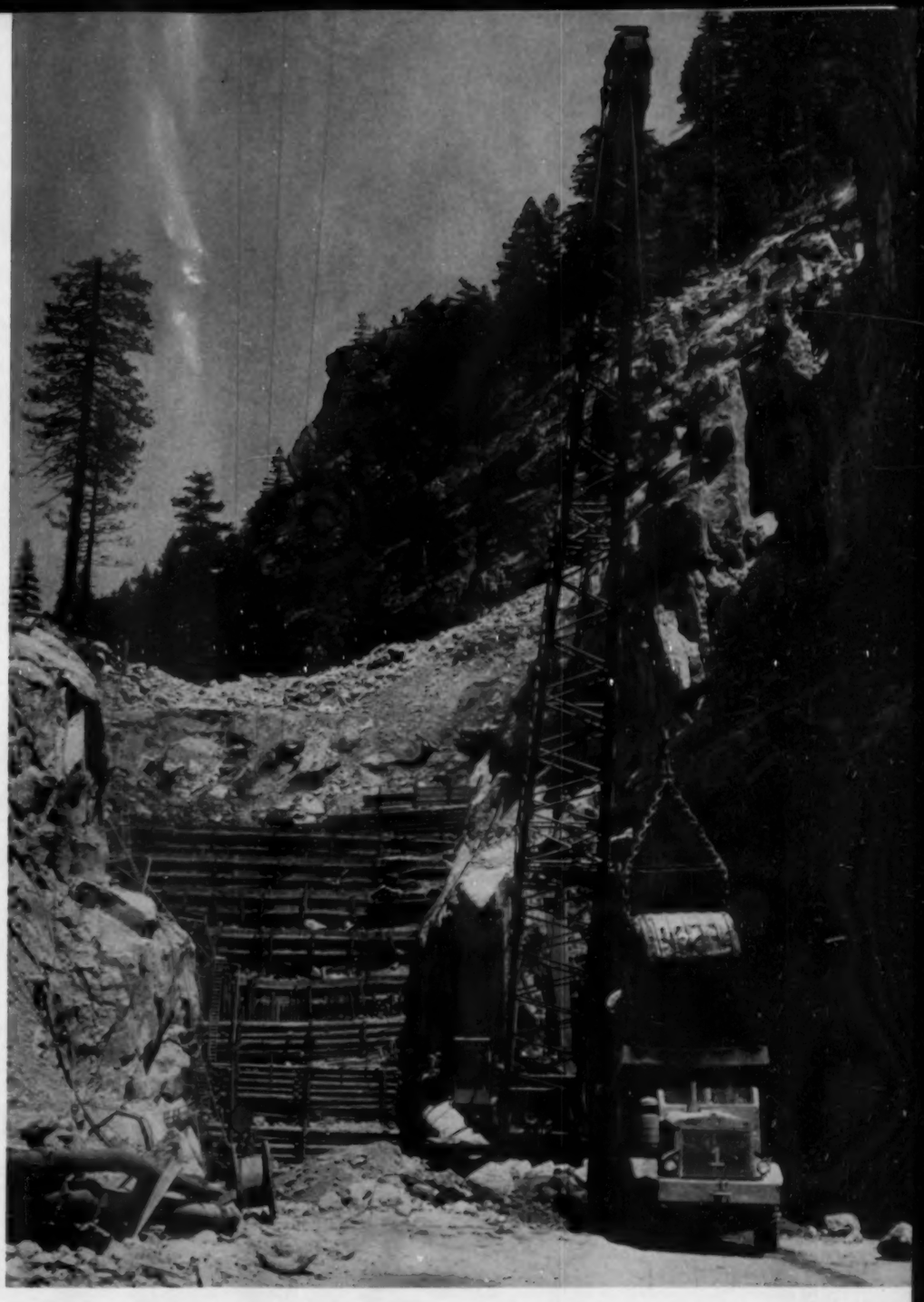
Project Administrative Manager E. C. Shipp passed the writer into Donnells and furnished this line-up of equipment last September: 23 Euclid and Dart

A view of the downstream end of the diversion tunnel at Donnells Dam. The relatively small amount of pumping required to keep the excavation of the dam dry is indicated by the water being discharged by the pipe in the right side of the picture. This pumping is done on an intermittent basis.





Tough logging at Donnells: Peterbilt truck powered by Cummins coming up from the bottom of the canyon with a load of pine logs.



Tri-Dam project—Excavation for foundation of Donnells Dam, looking upstream.

trucks; GM and Cummins engines; 2 P & H cranes; 1 Bucyrus-Erie 54B with Buda diesel; 6 Ingersoll Rand compressors; 3 of 600, 1 a 325, and 2 of 105 models, all with GM diesel engines; 4 Cat D8s; 1 Cat D2; 1 GM 750 power plant. At the bottom of the canyon logging off the timber were three Cummins engines doing yeoman service: 2 were 300s in Peterbilt trucks; and a 150 in an old loader change-over.

About 3,000,000 board feet of logs were sent through more than a quarter of a mile of solid rock to a Pickering Lumber Corp. mill in clearing the reservoir site at Donnells. Getting the logging equipment in was a problem. The logging crew totalled 40 men with 10 Cats and 1 Allis-Chalmers tractor. Tractors and trucks had to take a vertical drop of 300 ft to get to the bottom of the canyon near the damsite. A fuel line of 1,000 ft was run down the same slope for their service. Immediately the logging engineers had a choice of operations to get their logs out: either wait till dam was finished and float the logs out over the dam; or use the river diversion tunnel to get their logs below the damsite.

Pickering's logging Forester Abraham and Wixson & Crowe's Superintendent Nelson won out on the latter idea. But it took some doing to do it. Some logs were cut to 16 ft instead of the regular 32 ft to ease the problem. Some of the sugar pine was as big as 60 in. and more in diameter. There were "sinker" logs, too, that caused trouble at the discharge end of the tunnel. Eleven fellows working with chain saws felled the trees. The new Allis-Chalmers HD16 equipped with torque converter and Tracto-Shovel front end log loader handled that job. One of the 10 Cats with bulldozer built the road in the valley and down to the canyon to the tunnel. A dump truck hauled earth to cover rocks and make the road passable. Two more Cats skidded logs to side of road for loading by the Allis-Chalmers tractor. Another pair of Cats with Isaacson clearing rakes piled brush, small tree tops, cull logs and debris for burning. One driver for three trucks was sufficient on the short hauls, driver taking out a load while another load was made up, about 3500 ft of logs being taken each trip.

The narrow space made getting logs into the tunnel a ticklish job. Trucks had no room to turn around near water level. The unloading operation was set about 40 ft above water on the earth and rock diversion dam. A Cat D7 with Hyster winch with gin pole was used to roll the logs off the trucks down the embankment to the river. Many logs crossed and hung up during the unloading. A Cat D8 was set on the opposite side of river with Ingersoll-Rand air-operated winch. It pulled logs free. A LeRoi compressor furnished air. Looking at the tunnel area of 24 x 32 ft and a length of 1400 ft, both logging and dam engineers looked upon this feat as a real achievement, in view of the difficult topographical situations which confronted the operators at every turn.

augurs a bright future for the heavy construction industry in cutting costs and getting the great road building jobs done for a big saving in time and money for the tax payers.

Working two shifts, a 20,000-yard dirt moving day was the general schedule seen on the job last September. The dirt moving called for 3,300,000 yards to be moved last summer in order to get the dam ready to catch the winter water as well as earn the bonus for finishing ahead of schedule. The dam can begin earning its cost and paying off the bonds this year when every gallon of water is going to be needed to make up for a shortage of precipitation over the winter months just passed.

Tulloch Dam—Cat diesel in locomotive pulling train under aggregate plant. Four diesel trucks haul gravel to plant. Three are Peterbilt with Cummins and one has a GM diesel. Contractors on this part of the project are Arundel Corp. and L. E. Dixon Company. Texaco Service for diesel fuel, greases, etc., is standard throughout these three operations.

Tri-Dam project — Beardsley Powerhouse, Bucyrus-Erie shovel 54B.

BEARDSLEY, SECOND IN TRI-DAM STRING

BEARDSLEY, middle dam in the Tri-Dam water-power construction job is a marvel of efficient management of diesel equipment. It will be ready for feeding water to thirsty farms and homes while generating power for P.G.&E. by August this year. As in the case of the upper neighbor, Donnells, the job is being handled by a team of proven contractors in dam building. The Tri-Dam Constructors is made up of Morrison & Knudsen who have been rolling to fame and fortune ever since they teamed up with others on Hoover Dam nearly 30 years ago; Peter Kiewit Sons' Co. of Omaha, Macco Corporation and Stolte, Inc. M & W are operating over the world of big jobs today some $35,000,000 worth of diesel equipment. All are top names in their specialties; and the smooth working to overcome handicaps of weather and terrain to send the job toward completion nearly a year ahead of the deadline

This dam is to rise 280 ft above stream bed with maximum length of 320 ft. Thickness at stream bed is 1200 ft. A small power house is included in the contract just down stream from dam. Length of haul from borrow pit is only about a mile.

Equipment on this job are: 1 Euclid loader; 1 Manitowoc 4500 shovel with 5½-yard dipper; 27 Euclids, all Cummins engines except for 3 GMs; 4 Dart trucks powered by Cummins; 2 Cat D9 tractors; 1 DW20 Cat; 1 Cat D8; 6 large compressors—2 Chicago Pneumatic, 4 Ingersoll-Rand, all with GM engines; 1 Eimco with Cummins engine; Winslow oil filters on all equipment but Cats.

The Beardsley dam shop storekeeper when quizzed about cleaners and filters pointed to the stock of Winslow cartridges and filters. He said this brand has been used for at least ten years, or ever since he had been on the job for the contractor. Allison torque converters were on the Euclids. Five of the Cummins engines were torque-converter equipped. The answer to oil and grease service came as we prepared to leave for Donnells. A big Peterbilt tanker and trailer truck drove up and started to unload into the battery of elevated tanks that supply the fleets of trucks, tractors, shovels, etc. It was delivering 7,000 gals. of Shell diesel and gas fuels from Miles & Sons, Stockton. The Peterbilt was powered with a Cummins diesel. The grease house was a busy and important spot at Beardsley and my camera caught a Euclid truck on the platform getting service in its turn near the end of the afternoon shift.

Some of the personnel contacted on the job who cooperated in getting pictures for DIESEL PROGRESS: Kinney Hayes, Day Superintendent; Chris Nielson, Power Superintendent; George Coons, Swing Shift Superintendent; Miles Molesworth, Safety Supervisor; M. E. Schmidt, veteran compressor operator. Above these men at the top in the office, we first contacted and got data from: O. H. Tucker, Tri-Dam Project Manager for Morrison & Knudsen; and E. C. Shipp at the Donnells dam as project administrative manager. These men have all come up from the bottom over the years of dam and other construction jobs and represent the modern American frontier conquerors just as surely as did the railroad, stage coach, gold hunters and loggers of our grandfathers' days. But they are after something more important than mere gold today. It's water, catching and harnessing it for food and power for increased population demands.

TULLOCH IMPORTANT FOR IRRIGATION

THE Tulloch dam, located 45 miles down the Stanislaus River from Beardsley, is the most important from the standpoint of furnishing irrigation waters for the two districts of Oakdale and South San Joaquin. This dam will be used to store any excess water that passes the upper works, or Donnells and Beardsley dams, to stabilize the river and prevent the destructive floods that occur in times of excess rains. This dam is a concrete gravity type with gate-controlled spillway on the left abutment. Most of the water passes through a pair of 114 in. diameter penstocks into the power house, or through two 6 in. diameter outlet pipes. The old Goodwin dam will be raised 7 ft as part of this project. It forms an afterbay to regulate discharge down the river.

Statistics on this dam are as follows:

General—Stream—Stanislaus River. Available water—Average 1,000,000 acre feet per year. Drainage Areas—987 square miles. *Reservoir*—Length—7 miles. Area Covered—1260 acres. Maximum Pool Elevation—510 ft. Storage—68,400 acre feet. *Dam*—Concrete Gravity. Total Length—1600 ft. Height Above Streambed—165 ft. Maximum Height—200 ft. Maximum Thickness at Base—165 ft. Thickness at Crest—12 ft. Volume of Concrete—230,000 cu yds. *Powerhouse*—Installed Capacity—2 units 17,000 kw. Maximum Static Head—149 ft. *Goodwin Dam*—Construction—Concrete Arch (constructed 1916). Work Involved—Raise 7 ft. Remodel Intakes. Storage—500 acre feet.

Beardsley Dam is located about 12 miles downstream from Donnells Dam, on the Middle Fork of the Stanislaus River. Beardsley provides the major water storage for the Tri-Dam Project, impounding 97,500 acre feet of water. The 280-ft high dam has a rolled earth core with gravel and cobble shells on either side of the fill, and a riprap of quarried rock on the outside surfaces. This photograph shows construction of the downstream face of the dam. One of 27 Euclid trucks loaded with rock. Bucyrus-Erie shovel and Cat D8 with bulldozer.

Rear view of Drive-In Rambler, showing mounting of Deutz diesel above rear axles, and with vertically directed elbow on the cooling air intake. An open-mesh screen protects belt drives to auxiliary drives, yet allows for visual inspection.

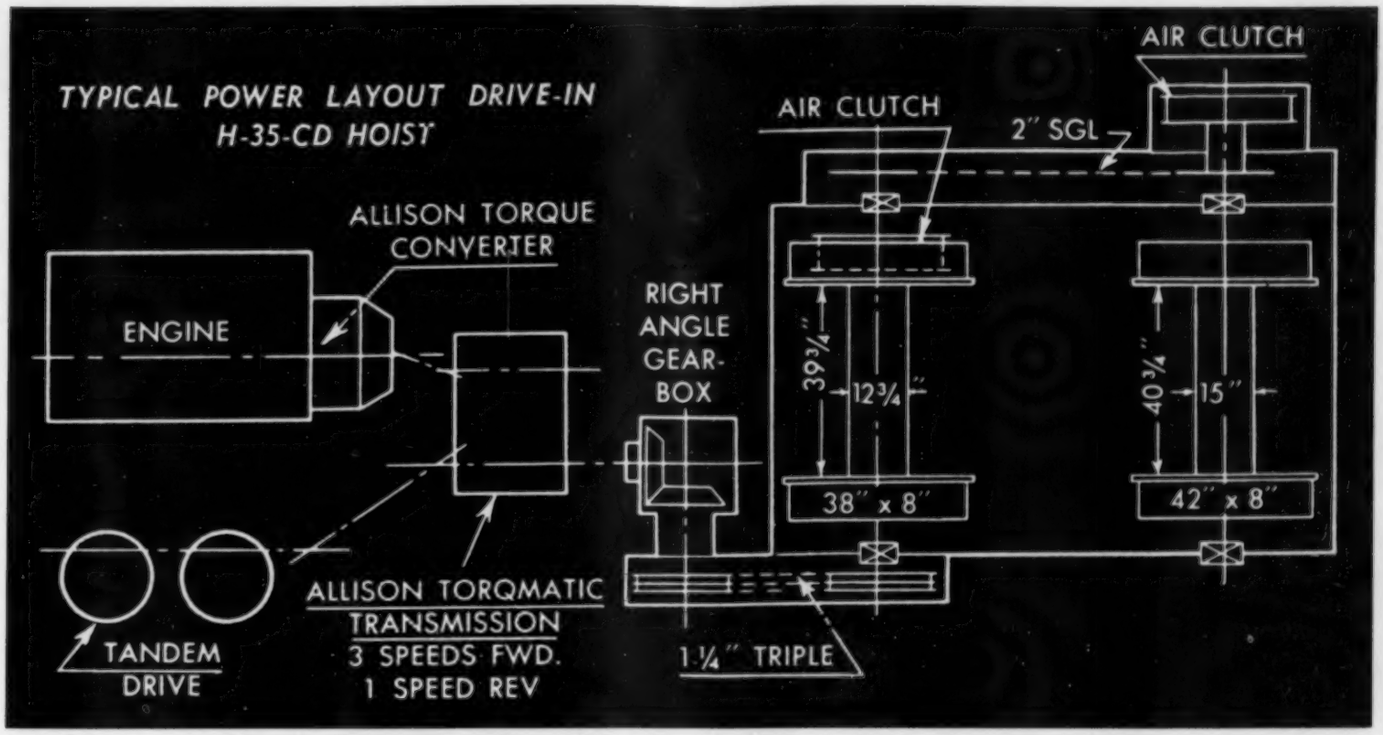
DIESEL DRIVES WORKOVER RIG

By MICHAEL T. PATE

OILWELL servicing and workovers demand a mobile unit which must perform many of the tasks of a drilling rig required to complete the well in the first place; yet the expense of moving in a standard rig is so great that in many instances the workover or servicing would never pay out. To perform this highly specialized work, Ideco, one of the Dresser Industries, has developed a dual-purpose rig which is self-propelling and which can meet exacting well-head requirements. Designated as the Drive-In Rambler, the rig relies on a 250 hp air-cooled Deutz diesel for all power: locomotion as well as drilling equipment drive. The Deutz, developed by German engineers during World War II, is a 12-cylinder diesel, rated 200 hp at 1800 continuous but capable of an additional 25 percent in output for short periods. The engine is a V-type design, with separate cylinders and air hoods. Any cylinder can be pulled independently of the others, without dismantling the remainder of the engine.

Air for cooling is drawn in through a large diameter elbow, terminating in a stub riser which may be fitted with a dust arrester for operation in dusty areas or where wind-blown trash is a problem. A portion of the cooling air is diverted around each cylinder, and passes out at the sides of the engine, eliminating a draft condition at or around the drawworks. The engine, complete with air-cleaner and other accessories, weighs under 2,800 lbs. The Drive-In Rambler incorporates many novel design ideas. The unit is equipped with four axles, the two front ones carrying single wheels and permitting articulated steering. The rear axles carry dual tires and afford support for the engine when the rig is on location, as well as carrying the top of the mast when that member is folded back for road travel.

The Deutz engine drives through an Allison torque converter, and the power may be passed through an Allison Torqmatic transmission to drive both rear axles. When so employed a road speed up to 35 mph is attained, with the gear box so designed as to allow special low-gear drive for negotiating steep hills or sand beds. To power the two drums used for the servicing or workover operations the same torque converter and Torqmatic transmission are used, power being fed through a right-angle gear box to a triple chain drive from which, through air clutches, either the main hoist or sandline drum can be driven or, if occasion requires, both can be powered. Use of



Diagrammatic lay-out of Deutz diesel and the transmission and torque converter hook-up which permit selection of engine for either powering the rear axles for travel, or the double drums for well-servicing or workover.

three speeds forward and one reverse in the Torqmatic provide ample control for the heaviest lifts which may be met at the wellhead.

All controls are centralized in the cab which, set well forward over the dual front axles, enables the operator to judge road conditions and guide his 8 ft wide vehicle effectively. At the same time, with the mast set over the front axles, he can drive directly up to the well and accurately center the unit on the well; permitting straight line hoisting of tubing, string or casing. The front legs of the box-like sub-frame of the mast contain leveling devices which can be set to take as much of, or all of, the mast load without placing overloads on the front axles. In practice the main line deadfall is fastened to the lower horizontal member of the box frame. Side outriggers provide against overturning.

The carrier, with its 8 ft width bringing it within highway limits, has a wheelbase of 26½ ft, and an over-all length, when equipped with a 95 ft mast, of 57.5 ft. Road clearance, vertically, is kept within the 13.5 ft limit. All standard safety features of a truck for highway operation are incorporated, such as power steering on all four front wheels; air brakes, lights, windshield wipers, and clear visibility ahead and to sides. The same hydraulic unit which energizes the power steering is used to raise and lower the guyless mast, which may be extended or telescoped with all reeving and other lines intact. An added feature of the Drive-In Rambler is that it can be equipped with rotary drive—also powered by the Deutz main engine or with separate 75 hp engine—and matching substructure for light drilling duty and slim-hole geophysical prospecting.

Front end of Drive-In Rambler, showing location of operator's cab well within the protection of the mast sub structure, but with clear vision of both driving and well-servicing operations. Operation of the hydraulic mast lift is from the cab, as are hoisting drums.

DRILLING PLATFORM *MR. ARTHUR*

By DOUGLAS SHEARING

THE *Mr. Arthur*, new offshore drilling vessel just completed for Coral Drilling Company, was christened February 23 in a colorful ceremony at Mobile, Alabama, by Mrs. Arthur O. Wellman of Boston, Massachusetts. The event was attended by a large number of friends, oil industry executives, civic officials, American Bureau of Shipping personnel, Coast Guard and Naval officers, and shipyard executives. Coral Drilling Company, of Fort Worth, a privately owned corporation, is a newcomer to the field of offshore operations. However, its operational management and personnel have a high experience level in offshore drilling and are under the leadership of Ted Weiner, who has engaged in the drilling business since 1932, and who is also senior partner of Texas Crude Oil Company.

This outstanding unit, which will shortly be in operation for The California Company, was designed by Friede & Goldman, Inc., Naval Architects and Marine Engineers of New Orleans. It is the second mobile drilling vessel of Friede & Goldman design to be built by Alabama Dry Dock and Shipbuilding Company, the first having been the pioneering California Company S-44. Designed to drill in water depths of up to 70 ft offshore, the *Mr. Arthur* is of the self-stabilizing submersible type, best suited for the particular bottom and weather conditions found in those depths and locations in which she will work in the Gulf of Mexico. In addition to other distinctive features, she is among the first mobile offshore units whose drilling equipment is entirely diesel-electric driven, with an Alco diesel electric system supplying energy to all drilling and auxiliary machinery.

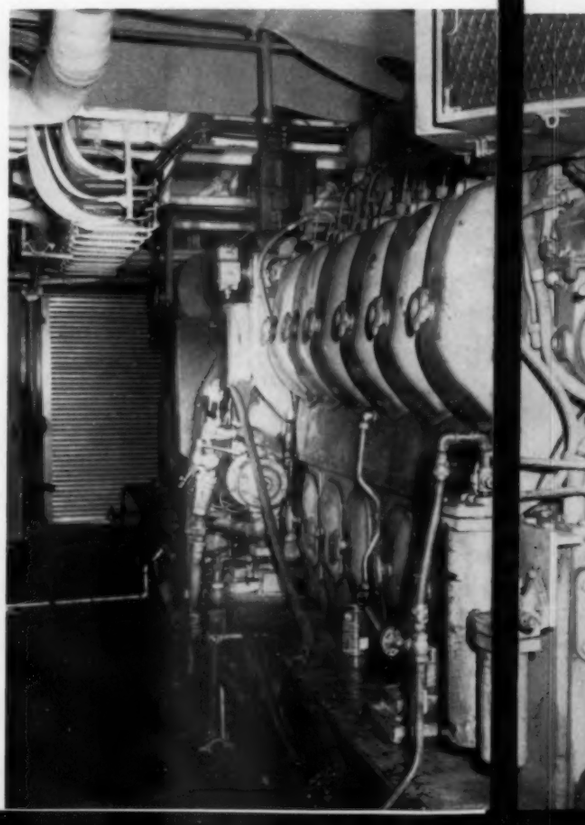
The drilling machinery on the *Mr. Arthur* consists of Brewster drawworks of the type on the rig which drilled the deepest well in West Texas; two Emsco D-1000 mud pumps, among the largest, most powerful mud pumps ever built. A specially constructed Lee C. Moore cantilever full-view mast with a derrick rating of 1,000,000 lbs hook load capacity, a thirty-foot spread at the base, and which is mounted on a mobile substructure so that three holes may be drilled at one location without moving the vessel. The entire drilling system is designed for drilling depths in excess of 20,000 ft. The mud pumps, the drawworks, and the tapered rotary are driven by General Electric Company dc shunt wound electric motors.

The main power plant consists of three Alco diesel electric generator units, each consisting of a 1000 hp diesel prime mover and the following driven generators: (a) Two 500 kw dc generators, set No. 1; (b) Two 500 kw dc generators and one 300 kw 450 volt 3 phase 60 cycle ac generator, set 2; (c) Two 500 kw dc generators and one 300 kw 450 volt 3 phase 60 cycle ac generator, set 3. Each of the above units drives a 50 kw 120 volt dc generator for motor excitation and power to the motor ventilating blowers. The main dc motors driving drilling machinery are shunt wound, speed being obtained by the Alco variable voltage control system.

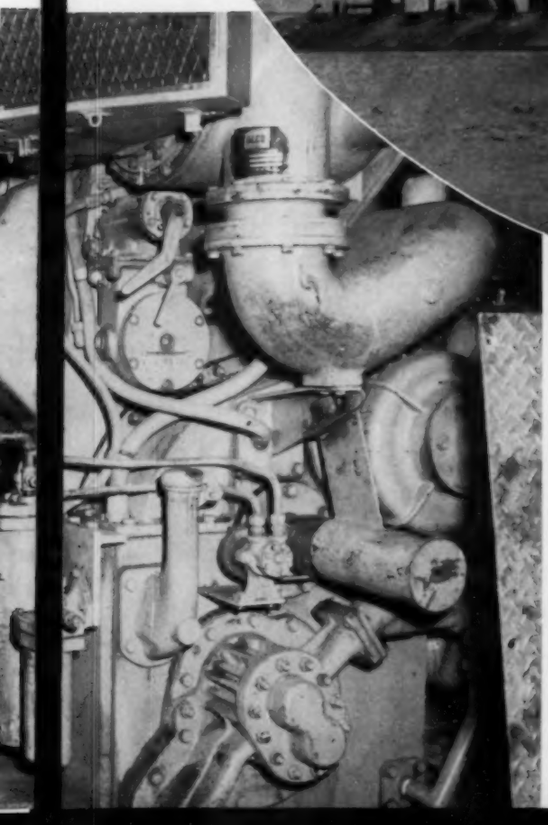
The Alco drilling rig power package installed on *Mr. Arthur* is driven by three of the company's 6-cylinder, 4 cycle, in-line model 251 diesel engines. The engine is capable of variable speed application such as on a mechanical transmission drilling rig and is also capable of continuous operation at its rated full speed. This engine is rated at 850 hp continuous, with an engine speed range from 350 to 1000 rpm. Each engine is equipped with an Alco water-cooled turbocharger, aftercooler, air inlet silencer and filters, Woodward governor and speed changer, over-speed trip and air starting motor. Other equipment includes temperature control valves, an alarm system to indicate both low oil pressure and high water temperature, and a crankcase ventilator. The lube oil system is complete with pump, cooler, strainer, filters, pressure regulating valve and all piping as an integral part of the engine assembly. The fuel oil filters, strainers, and all engine-driven pumps are also mounted on the engine complete before they leave Alco's plant. The jacket water cooling system, however, was installed by the platform's builder, the Alabama Dry Dock and shipbuilding Company, using

Harold Teasdel, President, The California Company; A. O. Wellman, associate of Ted Weiner, President of Coral Drilling Company; John M. Griser, President Alabama Dry Dock & Shipbuilding Co., Mrs Arthur O. Wellman, the sponsor; Jerome Goldman, Vice-President of Friede & Goldman, Inc.; Mr. Weiner, Tom Weymouth, Vice-President, Coral Drilling Company.

View in the engine room of the drilling platform *Mr. Arthur*, showing one of three Alco 6-cylinder, model 251 diesel engines. These four-cycle, in-line engines are rated at 850 hp continuous in this application, at speeds from 350 to 1000 rpm.



The Alco-powered drilling platform, *Mr. Arthur*, owned by the Coral Drilling Company. This platform, now in service in the Gulf of Mexico, carries an Alco drilling rig power package driven by three Alco Model 251, 6-cylinder diesel engines rated at 850 hp continuous.



a heat exchanger and temperature control valve furnished by Alco. The rig is capable of complete operation from the main engine generators alone without reliance on any outside power source.

The deck house sides are of plate aluminum; crew quarters for 44 men, as well as offices, dining salon and recreation room are air-conditioned; provision has been made for a Schlumberger well surveying and logging unit and a Halliburton cementing unit; two (2) Meco vapor-compression distillation units provide a total of 7,200 gals. of fresh potable and drilling water per day; and a 60 kw ac diesel generator has been provided for starting up from cold. The submersible hull incorporates a shaped bow section for efficient towing, and is of the full anti-scouring design, with skirts, previously found most satisfactory for such service.

The vessel has been documented and admeasured by the Bureau of Customs. General characteristics: —Length over all, 180′-0″; Beam of hull, molded, 151′-0″; Depth of hull, 12′-0″; Draft under tow, 6′-3″; Slot length, 34′-0″; Slot width, 32′-0″; Clearance above hull, 82′-0″; Drilling complement, 44 men, with top notch accommodations.

AVON RE-POWERED

J. C. Leonardi Towing Co. of Tampa, Fla., Makes New Vessel of 74-Year Old Tug With 600-hp Fairbanks-Morse O-P Engine.

By DOUGLAS SHEARING

NEARLY three-quarters of a century ago, the Army's Corps of Engineers built the Tug *Avon* up at Buffalo, New York, fashioning her hull of heavy charcoal iron and powering that hull with a "huge" 125-horsepower steam engine. Today, operating as queen of the J. C. Leonardi Towing Company fleet, the *Avon* is one of the most active and powerful tugs in Tampa harbor. She is virtually a new boat and, in place of the old steam engine, there is a 600-hp. Fairbanks-Morse opposed-piston diesel.

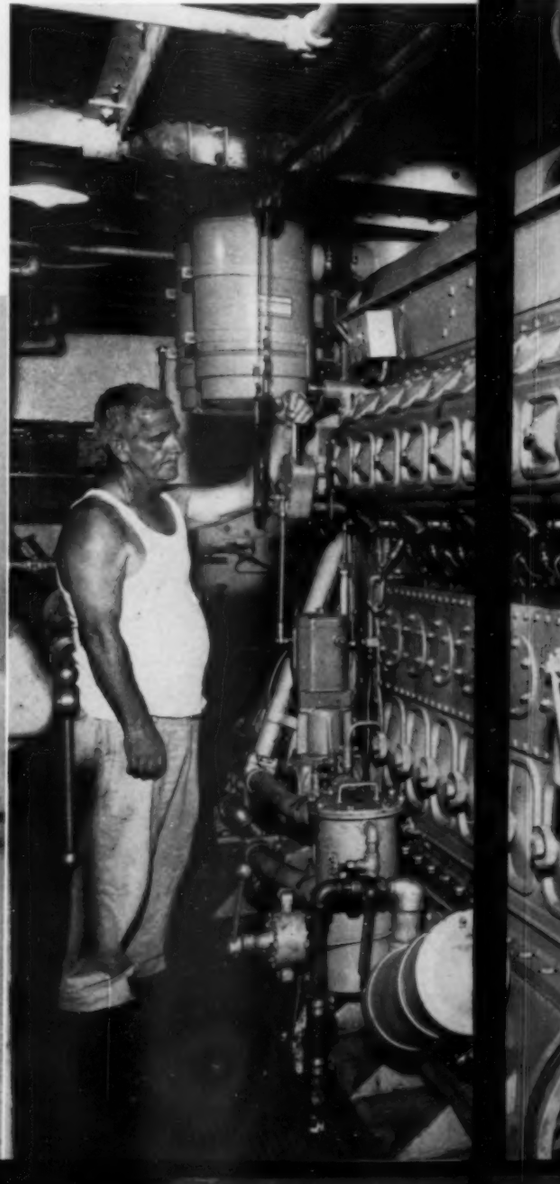
The tug had 74 years to achieve this metamorphosis since going into service back in 1882, and the change was not all accomplished in one big jump. First the steam unit was replaced with a 180-hp Nelseco diesel which was in turn supplanted by a 350-hp Superior engine. At this point in her development, John C. Leonardi acquired the vessel (in 1952) and began a program of renovation. Virtually everything on the vessel is new except the hull which was found sound and needed only minor repair. The program culminated in January 1956 at the Hendry Corporation's yards at Rattlesnake, Florida, with the installation of the 600-hp Fairbanks-Morse diesel.

The new engine is a Model 38F5½ opposed-piston heavy-duty marine diesel developing its rated 600 hp. at 1200 rpm. Driving through a Snow-Nabstedt reverse-reduction gear with 3.79 to 1 ratio, the engine turns the single screw at 318 rpm. The propeller is a 4-bladed 76 x 38-in. Ferguson with extra wide blades providing a developed area of 3100 sq in. The *Avon* is 69 ft in length overall and has an 18-ft beam. The bow is sharper than the prevailing style and the unusually heavy iron hull contributes to a draft of 10 feet. The stern is flat and provides plenty of water for the over-sized wheel, resulting in excellent power when the tug is called on to show her muscles.

The compact opposed-piston design made two things possible. First, it permitted installation of 600 hp in less space than the 350 hp engine occupied. Second, it effected a substantial weight saving since the new OP weighs only about 10 tons complete with accessories compared to 20 tons for the old, less powerful unit. This weight saving has been translated into greater fuel capacity. The old fuel tanks under the wings held a total of 1800 gal. These were removed and new tanks with 3400-gal. capacity were installed lower down in the bilge. A packaged unit, the new diesel is factory-equipped with Ross oil cooler and jacket water heat exchanger, twin Air-Maze air filters, a Purolator cartridge-type by-pass lube filter, an Air-Maze full-flow lube strainer, a Purolator fuel filter, and Fairbanks-Morse pumps. Also installed in the engine room are two 25-kw Hercules auxiliary generator sets.

The man in the pilot house has complete control of the vessel, with the mechanical linkage to the big double-plate rudder, throttle control for the diesel, and Westinghouse air control for the reverse gears. Mr. Leonardi reports that there is no need for an engineer and that in emergency one man could operate the tug. In practice, he often works with only a two-man crew, though frequently the job calls for more manpower. Also in the pilot house is a Philco ship-to-shore radio. The *Avon* does general harbor work, mostly docking and undocking ships and has handled vessels as large as 150,000-barrel tankers. The renovated tug also is rigged for work outside the harbor and has quarters for seven men. On a number of occa-

When the J. C. Leonardi Towing Co. installed a 600 hp opposed-piston Fairbanks-Morse diesel in the 74 year old *Avon* the company achieved two things: a more powerful engine in less space and a substantial weight saving which was translated into greater fuel capacity.

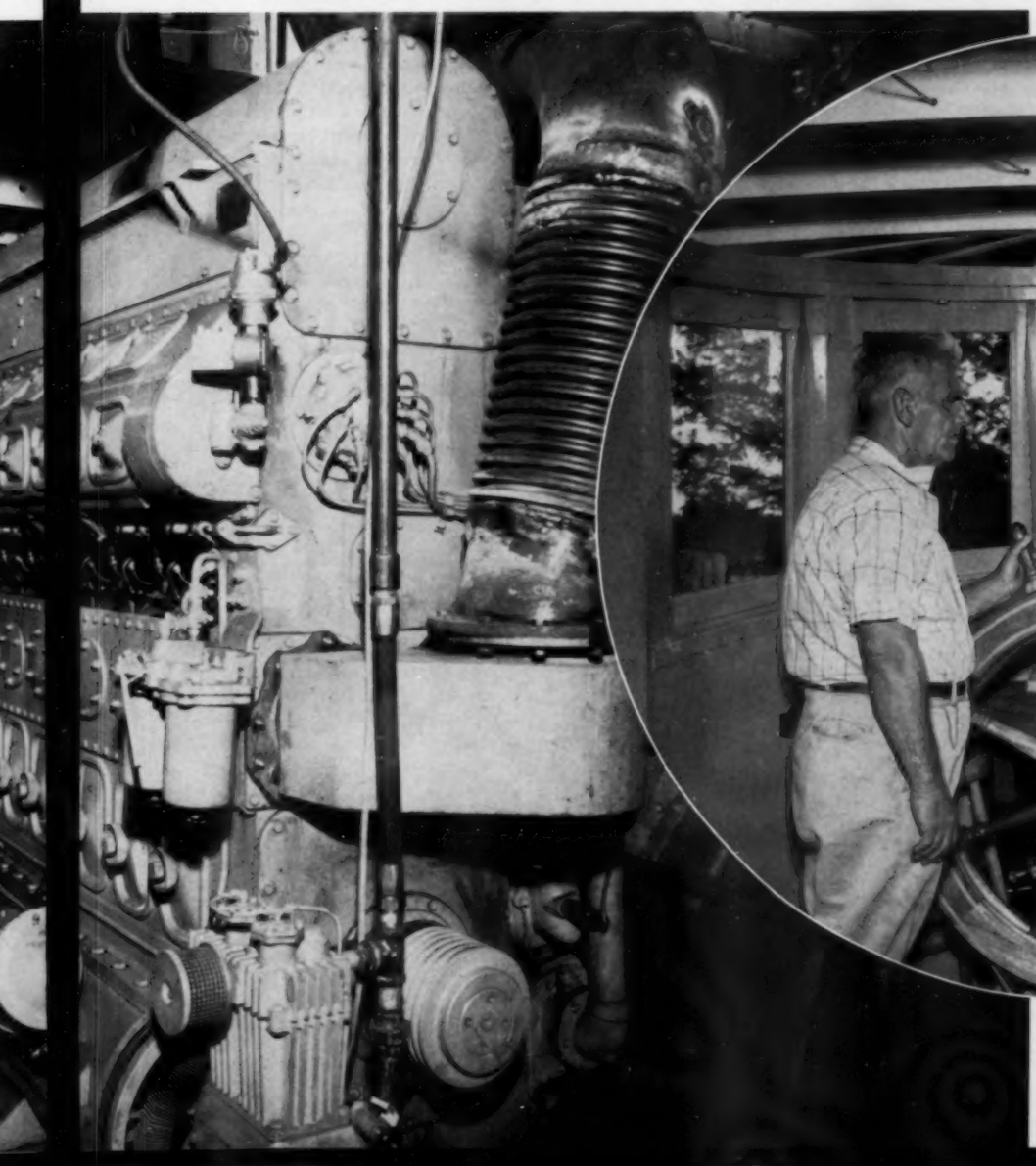


sions, the *Avon* has been called on to pick up disabled ships in the Gulf. But her principal job is assisting ships in Tampa's ample harbor and she averages about 25 ships a week.

According to Mr. Leonardi, the combination of substantially greater power and slower propeller speed has greatly improved the tug's maneuverability, obviously a matter of prime importance in harbor work. Despite the heavy hull, the vessel reverses quickly and responds instantly to rudder. And not only can they put her where they want her, but they can make their strength felt when they get there. With the increased power, Mr. Leonardi reports the tug far more effective in her work. One pilot who knew the *Avon* before and after re-powering is quoted as saying: "Previously she was able to assist a ship. Now she is able to handle a ship." Though built for power rather than speed, the *Avon* can attain a top speed of 12 miles per hour. Mr. Leonardi has been in maritime work all his adult life and started his towing company back in 1925 with the 30-ft Tug *Dorothy*. Today he still operates the *Dorothy*, the larger Tugboat *Roy*, and the *Avon*.

The Fairbanks-Morse engine powering the *Avon* is a Model 38F5½ opposed-piston heavy-duty diesel developing its rated 600 hp at 1200 rpm. It is factory-equipped with twin Air-Maze air filters, a Purolator cartridge-type by-pass lube filter, an Air-Maze full-flow lube strainer, a Purolator fuel filter, Fairbanks-Morse pumps, a Quincy air compressor, and Snow-Nabstedt reverse reduction gear with 3.79 to 1 ratio.

The man in the pilot house has complete control of the *Avon*, with mechanical linkage to the big double-plate rudder, throttle control for the diesel, and Westinghouse air control for the reverse gears. There is also a Philco ship-to-shore radio.



TOWBOAT *MARK EASTIN*

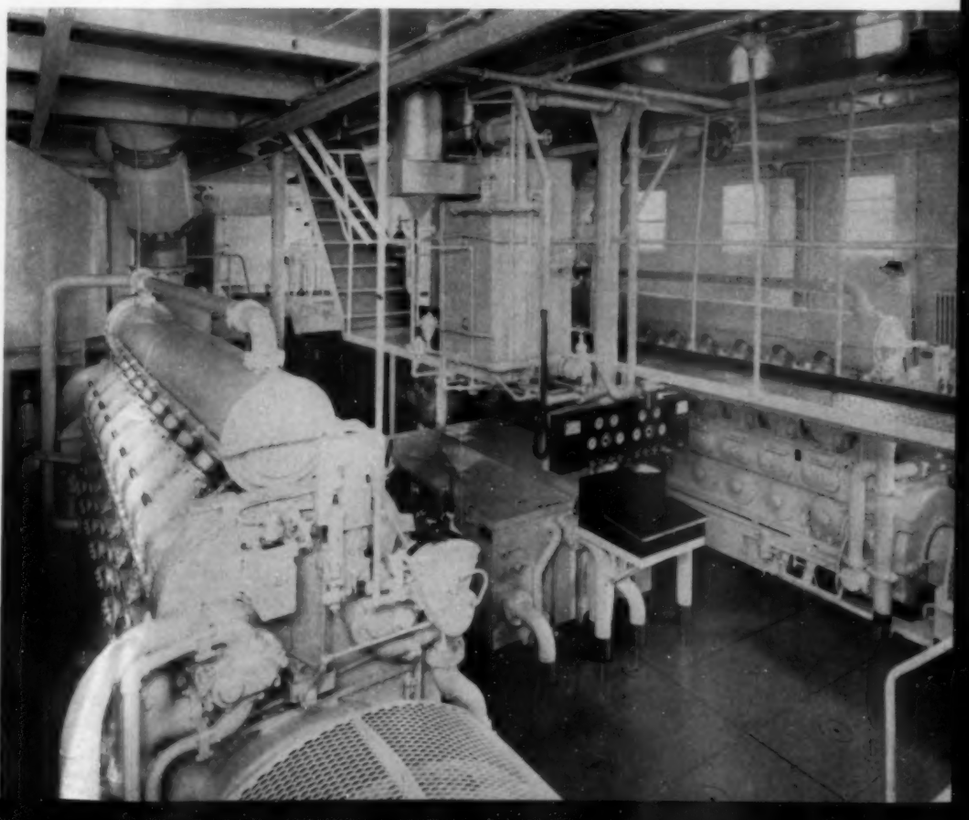
A NEW page was written into the history of the Mississippi River when the new 5600-hp towboat, *M/V Mark Eastin*, was christened at Paducah, Kentucky, on Monday, May 13, 1957. The *M/V Mark Eastin* is named for Mark E. Eastin, Jr., President, West Kentucky Coal Incorporated, Madisonville, Kentucky. The towboat *M/V Mark Eastin* is not only one of the most powerful towboats to operate on the inland rivers of the country, but also one of the most powerful vessels of its kind to ever have been built in the United States. The *Mark Eastin* was built at the Nashville Bridge Company. The hull is 177 feet in length and 42 feet in breadth and the forward shear carries the deck 2 feet above the amidship depth of 11 feet, 6 inches.

The main propulsion machinery of the *Mark Eastin* consists of two 16-cylinder model 498 turbocharged 2-cycle Cleveland Diesel engines. Each engine is rated 2800 bhp at 850 rpm. The towboat is equipped with two stainless steel, four blade propellers turning at 243 rpm. These 108-inch diameter screws weigh well over 2½ tons each. They are housed in scientifically designed Nabrico half nozzles for greater efficiency. The two steering and the two flanking rudders are operated by pilot house manually controlled reversible air motors which drive a geared quadrant through worm gear reducers and pinions. The auxiliary power for the *M/V Mark Eastin* is furnished by two General Motors model 6-110 diesel engines, each connected to a Delco generator, rated at 100 kw, 450 volts. These are controlled by a dead front switchboard located centrally in the engine room.

The pilot house has been designed to insure the pilot maximum visibility while operating the towboat. Over 155 square feet of polished, clear plate glass affords the pilot complete range of vision from the pilot house at an eye level height of about 40 feet above the water line. The four sides of the pilot house are sloped so that the possibility of reflection lights in the windows is minimized. The three forward windows are hydraulically operated and recess their full height into the bulkhead. From the pilot house, the main engines, steering searchlights, horns and bells, running lights, radar and public address system can be operated. Equipment located in the pilot house includes a radio telephone, and a sound powered telephone set which is connected to six points on the vessel. Located on and about the pilot house are a "quadruplex" air horn with manual whistle valve and synchronized signal light, a 144-inch radar scanner, and two 19-inch 45 amp arc searchlights. The muffler room divides the upper deck house into two parts which are connected by a passageway. The aft area contains three staterooms for guests. These staterooms are finished in mahogany, and are furnished with twin beds, chests and chairs. Also located at the after end of the upper deck house is the dining area and lounge. In the dining area is a stewards' pantry which includes a complete kitchen unit, range, sink and refrigerator. This compartment is located adjacent to the guests' dining area and is connected to the main deck by a dumbwaiter. A portable partition can be used to separate the dining area from the lounge.

The forward part of the upper deck houses the quarters for the mate and engineers as well as an officers' lounge. The master, steermen and pilots are quartered in the Texas deck house located just forward of the twin stacks. This area also includes the boat's office. The main deck house includes quarters for fourteen men, each stateroom furnished with a built-in double bunk bed with large drawers beneath lower bunk, lavatory and steel lockers. A bath is provided between each pair of staterooms besides the individual bath for the cook's quarters. The main galley crew's dining area is located aft.

The main propulsion machinery of the *Mark Eastin* consists of two 16-cylinder model 498 turbocharged 2-cycle Cleveland Diesel engines. Each engine is rated 2800 bhp at 850 rpm. The auxiliary power is furnished by two General Motors model 6-110 diesel engines each connected to a Delco generator, rated at 100 kw, 450 volts. Note Briggs filters amidship, Marquette governors on both engines and Alnor pyrometers.

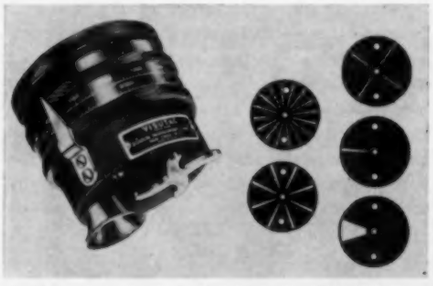


Crawler Moves Coal

19 tons at a pass—That's what this special coal blade enables this International TD-24 to move at the Kanawha River plant of the Appalachian Electric Power Co., at Glasgow, W. Va. The wings on the blade permit the TD-24 to shift 900 tons of coal hourly for the utility firm. This feat is accomplished over a 125 ft route from the surge pile to the stockpile. The 400,000 kw generating station burns 1,200,000 tons of coal annually, and maintains a 450,000-ton stockpile.

Speed Measurement Tool

Boulin Instrument Corporation, 10 First Street, Pelham, N.Y. has announced the latest designed Visutac. Visutac has become an important tool for the accurate, safe measurement of any type of motion, rotating, vibrating, oscillating or reciprocating. Because Visutac is mechanically operated, variations in reading due to power fluctuations of electrically operated equipment are eliminated.



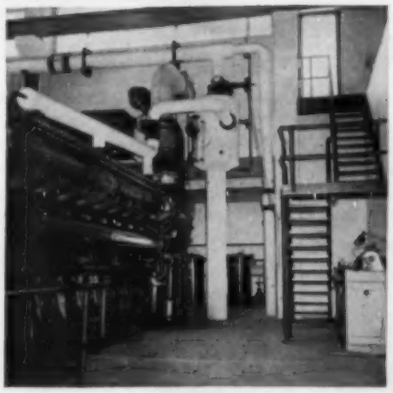
Visutac can be used to measure speed from a safe distance, and wear on the instrument is diminished because the instrument never comes in contact with the moving part of the equipment being measured. The added value of Visutac is that it can be used in explosive atmospheres without danger to the operator, according to the manufacturer.

Completely portable, Visutac offers engineering management a tool that can be applied in the laboratory as well as the plant, and high accuracy. Its diversification of application, allows every type of industry the advantage of being able to stop motion for the determination of speed, registration, pin-pointing of damaged parts, etc.

Visutac is available in two models measuring speeds from 500 to 8,000 or 1,000 to 16,000 rpm. Not restricted to its basic ranges Visutac will measure rotary speeds of less than 50 to 50,000 or more rpm by use of multiples. Complete information and descriptive literature available on request from Boulin Instrument Corporation.

ITS NEW

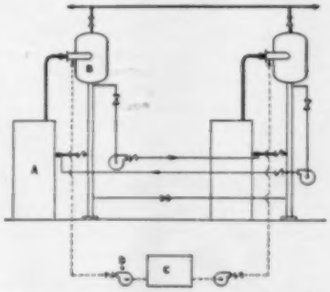
VAPOR PHASE® CONTRIBUTES TO SUCCESSFUL USE OF HEAVY FUEL AT FLORIDA KEYS ELEC. COOP.



FULL YEAR'S OPERATION ON No. 6 FUEL SHOWS SAVINGS OF $25,518.09

The installation uses two Superior 8-Cylinder, 1,422 H.P. Diesels, direct-connected to 1000 kw. Ideal Generators. The compactness of the Vapor Phase cooling system is clearly shown.

THE successful conversion to a heavy fuel system at Plant No. 2 of the Florida Keys Electric Coop., at Marathon, Fla., has been greatly aided by the complete Vapor Phase cooling system supplied by Engineering Controls. Outlet jacket water temperature is maintained at the 220-230° level, and engine operation on No. 6 fuel is simplified by a cooling system which keeps the top of each engine hot at all times, and insures a free flow of heavy fuel. The 12-month fuel-cost savings is enough to tell the story of successful operation. The Coop. has purchased a 3,000 kw. unit with Vapor Phase cooling for immediate installation.



Saturated steam and water pass from engine (a) into Vapor Phase Separator (b). Water circulates by convection back down standpipe into engine inlet and absorbs rejected heat. The steam is used for heating fuel oil. Condensate is returned to collector (c), then returned to system by pumps (d).

"SOLE DEVELOPERS and MANUFACTURERS OF VAPOR PHASE THERMAL CIRCULATION (EBULLITION) ENGINE COOLING"

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AUTOMOTIVE DIESEL PROGRESS

A COMMENTARY BY MERRILL C. HORINE

Merrill C. Horine, for 38 years a member of the Society of Automotive Engineers, has been actively engaged in automotive engineering, sales promotion and training, advertising and editing of automotive publications since 1907. He has contributed numerous papers on diesel and allied subjects to the SAE and other organizations. An officer in the Air Service in World War I, he was a consultant to the Chief of Ordnance and the Automotive Division of the War Production Board in World War II.

Intake Temperature and Power

POWER and economy both suffer when the temperature of the engine's intake air is excessive. Twenty-six per cent of the weight of atmospheric air is oxygen and it is the oxygen in the air that makes combustion possible. Hot air is rarified air, containing less oxygen per cubic foot, which is why men must breathe faster and deeper on hot days than on cool ones. For this reason greater attention is being directed toward avoiding excessive temperature in the intake air of engines. Air expands as its temperature is increased, at given pressure, at the rate of 0.6606 per cent per degree fahrenheit. Thus, if a cubic foot of free air is raised from 60°F. to 100°F., or 40 degrees, it will expand 40 x 0.6606 per cent or 26.424 per cent. Thus rarified, a cubic foot will contain only 79.1 per cent as much oxygen as it would at 60°F. This does not mean that an engine operating at 100°F. will produce 20.9 per cent less horsepower than it would at 60°F., for there are other factors which enter into the result. According to the basis upon which SAE engine test correction factors are formulated, an engine loses nearly 1 per cent of its horsepower for every 10 degrees rise in ambient temperature. For a 40-degree rise, therefore, it would lose about 3.66 per cent. In a 200-horsepower engine, this would be 7.32 horsepower, using, in all probability, the same amount of fuel per hour, which means poorer economy on a pounds of fuel per brake horsepower-hour basis.

Thus an engine operating with hot intake air can be expected to give poorer performance and less economy than one taking in air at lower temperature. While the cooler, and hence the denser the air the better, from the standpoint of its oxygen content, it will not do to have the air too cool. In the case of a gasoline engine, the air must be warm enough to assure good vaporization of the fuel, this temperature varying according to the load on the engine. While this does not apply to a diesel in the same way, it is a fact that the cooler the air on entering the air cleaner, the cooler it will be at the moment of injection. This becomes critical, however, only upon starting, for diesels are able to operate effectively, once started, at temperatures down to 70 degrees below zero, without added heat.

The ideal situation would be to have the intake air at a uniform temperature, with means to add heat at starting. This temperature might be 60°F. It would be easy enough to raise the temperature to this level in cool weather; but reducing it below ambient, while possible, would be difficult to justify from an economic standpoint. A refrigeration means of sufficient capacity would undoubtedly consume considerably more horsepower than the engine would gain thereby. From a practical standpoint, therefore, what is required is an induction system which in hot weather will draw air in at as near the outside temperature as possible, while warming it as required when the weather is cold.

Substantially, this is what is being done to a large extent by vehicle builders. Years ago, when air cleaners were first applied to motor vehicles, they were located inside the cabs of motor trucks, so that they took in air not only at a more uniform temperature than if from outside the hood or under it but insured cleaner, dryer air as well. For a while several makes of passenger cars employed air scoops and ducts in the tops of their hoods, supplying most of the air reaching their air cleaners. This scheme is still used on a majority of sports cars and it is amazing that such arrangements have not been adopted more generally, particularly in view of the fact that several cars have dummy scoops as part of their styling. One make of bus for a number of years, took all of its intake air through louvres inside the bus, on the theory that air temperatures there were more uniform than anywhere else on the vehicle. As with the early inside-cab-mounted air cleaners, this conferred the additional advantage that such air was also apt to be cleaner and dryer.

Outside location of the air cleaner, experience has shown, although practiced by most builders of diesel trucks today, is not without its drawbacks. It has been found that in cold weather, ice can form over the filtering element and, during hard rains, an undesirable amount of water contamination of the oil-bath type can ensue. The considerable mass of these cleaners, furthermore tends to unduly cool the air taken in during cold-weather, even when arrangements are made, by means of a damper, to take warm air from under the hood to the cleaner. In one application, the right-side cowl ventilator must be sacrificed to accommodate such a damper arrangement. Although there appears to be no record of such an occurence, it is even possible that sufficient water could be passed through the cleaner in a long downpour to interfere with the engine's operation, if not to form a water lock in combustion chambers.

While the outside location of the air cleaner does reduce the temperature of the intake air below what it would be with the cleaner mounted and drawing air in from under the hood, this is not the sole reason for the popularity of the outside location. To do a good job under dusty locations, oil bath cleaners have reached such proportions of size that is is difficult to find room for them under the already crowded hoods and designers are coming to a growing realization of the importance of leaving some free space around the the engine for exit of air from the radiator and fan. Even mounted outside, alongside the hood, a considerable amount of conducted heat will reach the cleaner. This may not be apparent on feeling with the hand, for the passage of air through it serves to absorb much of this heat, passing it along to the engine. When located at the rear of the cab, as in some of the COE models, much of the air supply comes from the blast of warm air escaping from the engine inclosure, under the cab floor.

That the matter of intake air temperature is serious becomes apparent when it is considered that in warm weather, underhood temperatures, due both to convected heat from the radiator and cylinder block and radiant heat from the exhaust manifold may reach as high as 130°F. An air duct extending from the grille, as until recently employed for ventilation by several automobile designs would not supply the low air temperatures desired. Much heat would be absorbed from the engine and surrounding sheet metal and the air from that location is not notably clean being in the zone of dust and splatter from the wheels of preceding and passing vehicles. In a hard rain, it would draw in an undesirable amount of water

and in snowy weather, there would be danger of the opening in the grille being blocked off. Perhaps the answer is an intake pipe extending above the cab roof, similar to the snorkels used on amphibious vehicles. With so many diesel-powered vehicles employing exhaust stacks, it would not be fantastic to imagine a corresponding stack for intake. Where as in many trucks and tractors, the exhaust stack is on the right side, at the rear of the cab, such an intake snorkel might be placed to balance it on the left. With suitable silencing, it might be worth considering to return to first principles and take the air from inside the cab, thus insuring eduction of foul air therefrom and perhaps lightening the dirt load on the cleaner. This would eliminate any need for seasonal dampers, since the heated cab would prevent freezing temperatures.

Executive Vice President

S. G. Paddock

Mr. S. G. Paddock was elevated to the office of Executive Vice President at the recent Directors' Meeting of the Burgess-Manning Company, Libertyville, Illinois. He formerly served as Vice President in charge of the Industrial Silencer Division, with offices in Libertyville, Illinois, and Dallas, Texas. Also newly elected were Mr. F. P. Hutchinson as Director, Mr. E. D. Woisard to the office of Treasurer and Assistant Secretary, and Mr. A. W. Dreffein to the office of Secretary. Mr. Hutchinson was formerly President of Harrington & King Perforating Co., and the other newly elected officers have long been associated with Burgess-Manning Company.

Test For Combustion Leaks

An immediate positive test for internal combustion engine leaks can be made with a new product called the P&G Bloc-Chek, according to the manufacturer. Utilizing a completely new principle in the automotive field, the Bloc-Chek will tell the mechanic in one minute's time whether or not an internal combustion leak is present, regardless of whether the leak is caused by a faulty gasket, a cracked or warped cylinder head, or a cracked block. The ability to positively determine whether or not a combustion leak is present, will save considerable time and expense in engine diagnosis and cure.

Use of the Bloc-Chek enables shops to instantly spot combustion leaks in the early stages, before the engine is damaged by loss of coolant and overheating. Test procedure is simple. Place the Bloc-Chek in the radiator opening. With the engine running and a combustion leak present, the combustion gases will pass into a sensitized fluid through a special porous bronze filtering unit. As the gas passes through the fluid, the color changes from a deep blue to a light yellow. If no combustion leak is present, the fluid remains blue, even though increased air pressure caused by heating or water pump cavitation results in air passing through the fluid.

P&G Bloc-Chek, manufactured by P&G Manufacturing Company, 305 N. E. Russell Street, Portland 12, Oregon, will be of great value to independent repair shops, fleet shops, and service stations. Bloc-Chek will detect any combustion leak, no matter how slight it may be at the time of the test. And, because a positive reaction is so obvious, the customer is easily convinced that work needs to be done. During anti-freeze time, Bloc-Chek will be valuable to fleet shops, and service stations, in determining whether or not it is safe to add anti-freeze to the radiator. Engine damage caused by anti-freeze seeping into combustion chambers will virtually be eliminated, according to the manufacturer. Adapters are available for larger truck, marine and industrial engines. P&G Bloc-Chek, as with other P&G products, is available through automotive parts and tool jobbers in all parts of the country.

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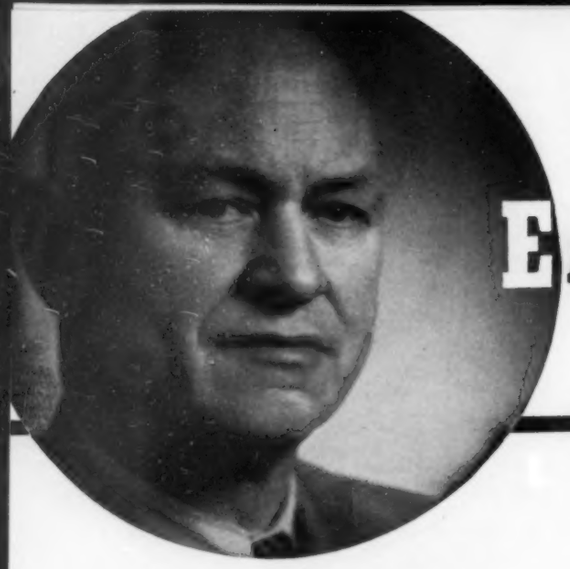


EASTERN DIESEL OBSERVATIONS

A COMMENTARY BY ARNOLD B. NEWELL

Arnold B. Newell, a third generation American, was born near Seattle, Washington of pioneer stock. He obtained his engineer's license at 21. Sailed as chief engineer on one of the first ocean-going motorships built in the U.S.A. In 1924 he joined New York Shipbuilding Company in diesel advisory capacity, tested and took to sea New York-Werkspoor diesels, supervised operation of shipyard owned vessels, then in 1927 joined Ingersoll-Rand as diesel field engineer. Became associated with "Motorship" in 1929. Subsequently became managing editor of "Motorship" and "Diesel Power," then vice-president and general manager.

Compound Economy

IN St. Louis I found a towboat regarding which not much was being said although it is undoubtedly destined to be given a lot of attention as time passes. The engines are a pair of 1300 hp 2-cycle turbocharged diesels using Vapor Phase cooling. As the result of turbocharging the rate of fuel consumption for these engines has been reduced about 12 per cent and it is reasonable to presume that some further improvement will result from high temperature cooling. Of more importance is the fact that Vapor Phase cooled diesels burn residual fuels more readily than engines with conventional cooling. By switching to residuals the cost of fuel can be cut about one-third. Whether this particular boat will or will not burn residuals is beside the point. Using fuel costing 12 cents per gallon, its fuel bill has been reduced about $53 per 24-hour day of full power operation by turbocharging. By burning residual costing 8 cents per gallon after processing another $130 can be chopped off the fuel bill each 24 hours.

On an hourly basis the saving is about $7.63. River pushing is a class of service in which boats work at full power over long periods of time. About the only towing service equal to it in point of sustained operation at full power is trans-oceanic work which lacks the element of constant repetition found on the rivers. This comment is a generalization. Fuel prices vary. Boats do not usually work at full power. It is still necessary to use some No. 2 fuel for starting, maneuvering and shutting down to purge the system of No. 6. I have not taken into account the saving that could be made by heating the boat under way with the Vapor Phase system instead of firing a small boiler. The fact remains, none the less that the potential maximum saving as stated will become a reality and when that happens my good friends with their slide rules will work out the figures to a fraction of a mill per day, hour and minute and present their findings before the societies of technicians. Meanwhile, I have seen a straw blowing in the wind that's well worth watching.

More Power for the South

Expansion of electric generating plants in the South and the Southwest should be a matter of considerable encouragement to the builders of large diesel and dual fuel engines. Rapid increase in use of electricity can be attributed to several current developments. One of these is industrialization of regions where labor is more plentiful. It brings steady employment to people whose standards of living thereby improve. When the population has more money to spend the business centers grow. Stores, offices, supermarkets, theatres, homes are air conditioned. To keep pace with the industrial, business and individual demands for more power the municipal and utility plants must grow rapidly in capacity. When the Southerner on the street decides air conditioning of his home is as essential to comfort in the summer as the New Englander believes central heating is essential in the winter, the call for electric power sparks the sale of generators and engines to supply it.

Obviously power will be generated by the cheapest method. Fortunately for the diesel, gas has been made available at reasonable cost and the internal combustion engine burns it in the most efficient manner. Many people are becoming increasingly aware of this fact and they are learning that small diesels using gas as fuel are not troublesome nor expensive to maintain. Enterprising engine salesmen are willing to add up the costs for them and reveal a surprising saving over the price of purchased electricity. We know of course that the municipalities and the utility companies must build and maintain costly power distribution systems. They must have offices and office help. This must be paid for through sale of electricity if a profit is to be made. The consumer whose power demand is large enough to warrant installation of a generating set can deliver it to his own system minus much of the overhead inevitably associated with operation of a private or a public utility. On the debit side of the ledger is the addition of another item of mechanized equipment to be taken care of.

Some people prefer to pay the higher rate and escape the nuisance of having a small power plant somewhere around. Therefore it is doubtful that "packaged power" will retard expansion of the utilities. It is apparent, however, that a new market for small engines has opened up in the South because the standards of living have improved and there exists ability to pay for creature comfort such as never existed in the past.

Dairies and Diesels

It is a matter of amazement to me that the diesel and the dairy industries have not gotten together to their mutual advantage long ago. It is doubtful that there is any place the diesel can serve more effectively than the dairies. A large dairy will process about 200,000 lbs of milk daily. Upon delivery the milk is weighed and then pumped into large tanks where it is agitated to keep the butter fat from rising; it is put through separators, pasteurized, homogenized and then chilled. These operations require both heat and power. The bottling machines are operated by electric power, the cases go to electric driven stackers and then to refrigeration. To make cheeses requires heat and to make ice cream refrigeration is needed. To hold milk products in storage takes more refrigeration. To wash, sterilize and rinse down the stainless steel tanks, containers, tubes and pumps requires an unbelievable amount of hot water which becomes sewage that is pumped to a disposal plant and finally out over fields, sometimes pasture land. This means more electric driven pumps.

A diesel can generate power for less than it can be purchased and provide an abundant supply of hot water and steam for the cleaning, sterilizing and drying processes. It will heat the vats in the cheese factory and wash them for the next batch. The diesel is a protection against high line failure. Some dairies have their own herds and they need power to operate the milking machines, the chillers and the pumps for the water supply. Most dairies use well water and a complete water works is operated. More power is needed to run the pumps. Compressed air is used in various elements of the mechanization and the compressors are electrically driven. But of all the big power demands, nothing equals the refrigerating machines. It seems that everywhere you look you see an ammonia compressor running with cooling towers, condensers and heat exchangers all over the place. Whenever a diesel sales engineer hears a milk bottle clank at the back door; when his youngsters pressure him for ice cream and when his wife picks up a package of cottage cheese at the supermarket he should resolve then and there to investigate a big dairy, its power needs and especially its demand for the kind of heat that goes to waste at the diesel exhaust and through the jacket cooling system.

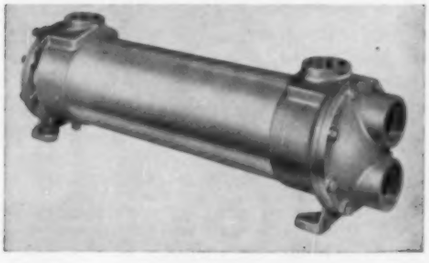
Advanced Engineering Section

Joseph C. Johnson

Formation of an Advanced Engineering Section at the American Bosch Division of American Bosch Arma Corporation was announced recently by Harold R. Sennstrom, Vice President-Engineering. According to Mr. Sennstrom this move is in line with the American Bosch Division's expansion program and the new section will concentrate entirely on new product concepts to assure the future growth of this Division. The new section will be headed by Joseph C. Johnson, currently Assistant Chief Engineer, Electrical Engineering Section and who was appointed Assistant Manager-Engineering in charge of the Advanced Engineering Section effective May 1.

Mr. Johnson came to American Bosch from Titeflex, Inc., Newark, N. J., where he was Manager of Research and Development. Prior to that he was associated with Pratt and Whitney Aircraft in East Hartford for fifteen years in various engineering capacities including those of Ignition Project Engineer and Fuel Systems Engineer. Mr. Johnson is a graduate of Marietta College and holds a Master's Degree in Physics from Brown University. He is a member of the Society of Automotive Engineers and was successively Vice Chairman and Chairman of the Ignition Research Committee of that organization over a period of years. He is also a member of the Institute of Aeronautical Sciences.

Lube Oil Cooler



For lube oil and water cooling on machinery, Whitlock Manufacturing Co., West Hartford, Conn., has announced a new line of Hi-Transfer Exchangers available from stock in a wide range of standard sizes. The new Hi-Transfer Exchangers are designed to assure maximum heat transfer with minimum pressure drop, according to the manufacturer. Shell and tubes are made for working pressures of 75 lbs and are tested at 115 lbs. All parts and exchanger units are completely interchangeable to permit fast, easy installation and servicing.

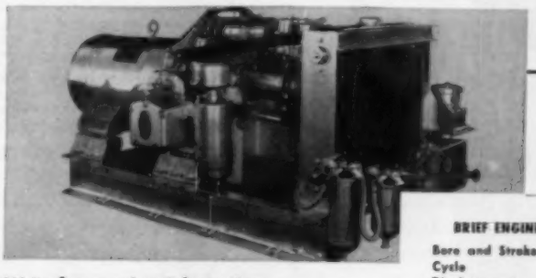
Whitlock Hi-Transfer Exchangers are fully standardized and mass produced to keep initial costs low. Parts are readily accessible to facilitate maintenance. The tube bundle can be inspected by removing the bonnets and the tubes can be cleaned easily because of the straight tube design. Selections can be made direct from stock for immediate shipment. Write the manufacturer for recommendations or descriptive bulletin. (ITS NEW)

WITTE MODEL 100RDA

A Diesel Engine-Generator Unit
12KW (Continuous)—1800 RPM

This powerful, compact, diesel engine-generator unit is setting outstanding performance records in maintaining either low (–10°F) or high (70°F) temperature in 50' mechanically refrigerated railway cars.

Many other uses are being found for the Witte 100 Engine, which powers this unit. Its low profile (30") makes it desirable in either stationary or mobile applications. Its two horizontally opposed cylinders provide an unusually smooth, vibration-free unit. The 100 Engine is built for continuous 24-hour-a-day operation and is outstanding in heavy-duty industrial applications.



BRIEF ENGINE SPECIFICATIONS

Bore and Stroke	4" x 4"
Cycle	4
Displacement	100 cu. in.
Speed	1,800 rpm
Horsepower:	
Continuous	18 hp
Maximum (Bare Engine)	23.7 hp
Height	30"
Width	39"
Length (Approx.)	66"

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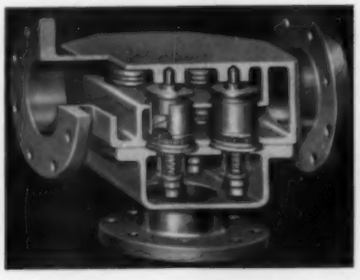

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GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

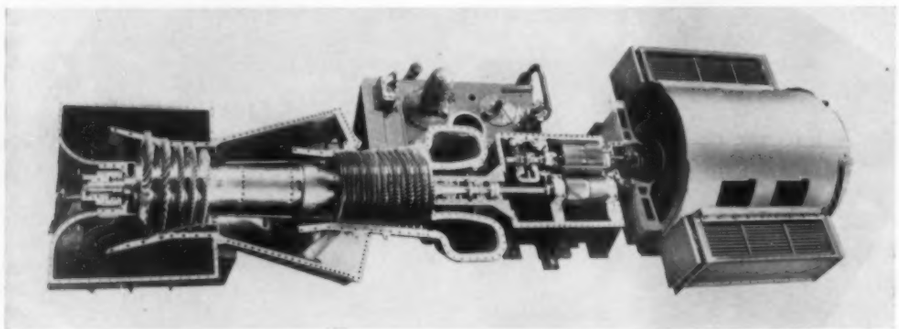
R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

FORT STOCKTON GAS TURBINE UNIT OF WEST TEXAS UTILITIES COMPANY*

THE Fort Stockton gas turbine unit was one of the first installed by Westinghouse Electric Corporation, December 1952. This has had its ups and downs as any first unit would, however it has an outstanding record which is shown in Table 1. Its basic rating is 5 mw at 80°F ambient temperature and an altitude of 1000 ft. It is operated up to 7 mw at 3000 ft elevation when the ambient temperature and compressor cleanliness permits. The five-stage turbine and the 16-stage axial-flow air compressor are coupled together and operate at 5700 rpm. The compressor ratio is 6:1 and delivers air at the rate of 111 lb/sec at full load. The air washer and precooler is a spray-type installation using 58°F well water. The system incremental loading schedule base loads this unit because of the low-cost gas supply.

house type of gas turbine has a good efficiency. Also note the overall cost of gas is reasonable as shown in Table 2 with gas fuel at .0605$/mm btu. When looking at the maintenance costs in Table 2, it should be kept in mind that this is an independent plant and consequently these figures are total maintenance costs for the entire plant, including gas-turbine generator unit and auxiliaries, station auxiliaries, water-well pumps, fuel system, and so on. The costly early experience with this unit, along with other factors, make it reasonable to believe that long-term maintenance costs for base-load operation will be lower than those experienced to date.

The operating personnel consist of four operators, one man per shift with a relief man, and the chief engineer. When the second unit is placed in operation in 1958 the plans now are to add a maintenance man to the plant personnel. Table 2 on production costs shows operating labor to be less than 0.5 dollar per mwh net which compares well with medium to small steam stations. It is evident that the operating labor with another unit in operation should be cut almost in half or to 0.25 dollar per mwhr net. The miscellaneous production cost in Table 2 includes the other plant expenses that are not itemized in the table such as rags, brooms,paper towels and water. The average miscellaneous cost of 0.1441 dollar per mwhr net also should be reduced materially by installation of another unit. In conclusion particularly note the early modifications and design difficulties are now behind them; there are no hours delay in 1955 or 56 in col. 5 of Table 1. In a previous issue of this column a long list of difficulties were given of General Electric's early gas turbine units on the El Paso Natural Gas Company's system. These units here also have their major difficulties behind them.



Westinghouse 5 mw gas turbine generator unit. Reading from right to left—generator, gear box, inlet to compressor, 16 stage compressor, combustor, 5 stage turbine, exhaust.

For the entire period up to August 26, 1956 the average load was 5213 kw with an average heat rate of 17,600 btu/kwh. This was with an average inlet air temperature of 64°F, exhaust of 743°F and turbine inlet of 1276°F. This shows the Westing-

TABLE 1 SERVICEABILITY

1. Date Year	2. Total Installed Hours.	3.* Serviceable Hours	4.*** Unserviceable Hours	5.**** Modification and Inspection Hours	6. Overhaul Hours	7. Forced Outages Hours	8. Other Scheduled Outages Hours
Dec. 1952	714.80	672.00	42.80	42.80	- -	- -	- -
1953	8,760.00	5,298.22	3,461.78	2,792.00	613.00	31.56	55.22
1954	8,760.00	7,410.88	1,394.12	748.00	436.00	21.83	164.32
1955	8,760.00	8,295.80	464.20	- -	394.00	4.20	66.00
** 1956	5,856.00	5,021.60	834.40	- -	776.00	16.00	42.40
TOTAL	32,850.80	26,698.50	6,152.30	3,583.60	2,219.00	73.59	327.94

* Also "Operated Hours" within a few hours.
** Up to August 26, 1956.
*** Note Column 4 = Sum of 5, 6, 7 & 8.
**** Including waiting for materials.

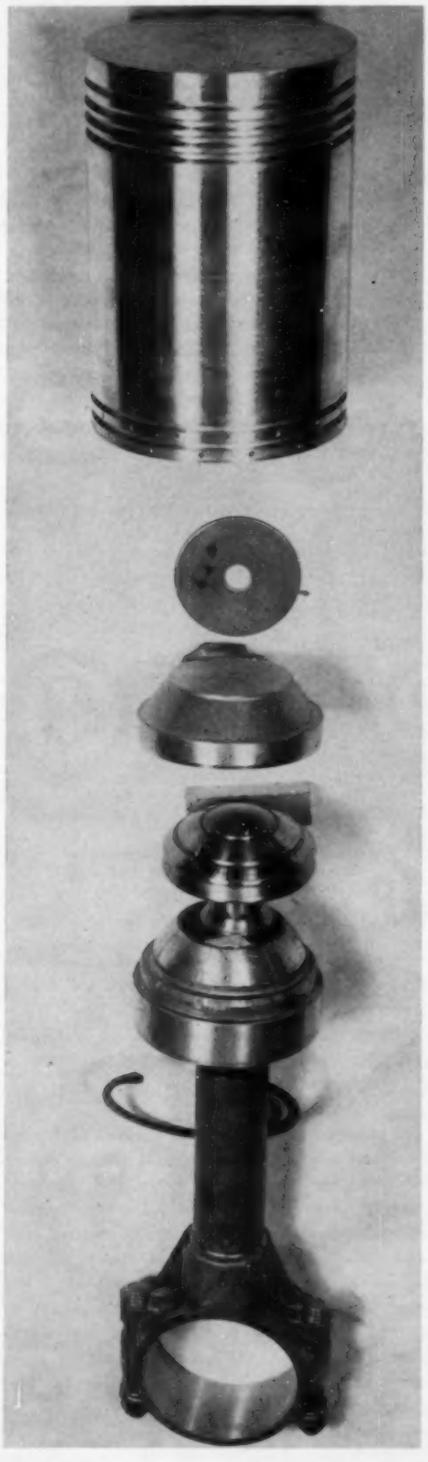
TABLE 2 PRODUCTION COSTS

	Year 1953		Year 1954		Year 1955		To Aug.26,1956		Combined Years	
	Dollars	$/MWH	Dollars	$/MWH	Dollars	$/MWH	Dollars	$/MWH	Dollars	$/MWH
Oper. Labor	15,791.	.6377	19,218	.4844	20,854	.4567	13,141	.4595	69,004	.4975
Fuel	28,470	1.1498	42,843	1.0798	49,152	1.0765	28,645	1.0017	149,110	1.0751
Miscellaneous	7,327	.2959	5,163	.1301	4,405	.0965	3,091	.1081	19,987	.1441
Maint. Labor	7,183	.2901	8,302	.2092	7,358	.1612	4,069	.1423	26,913	.1940
Maint. Material	5,030	.2032	7,779	.1961	14,971	.3291	7,574	.2649	35,356	.2549
Total Cost	63,803	2.5767	83,307	2.0996	96,741	2.1188	56,521	1.9766	300,373	2.1659
Net Gen. KWH	24,762,000		39,677,100		45,659,000		28,596,000		138,694,800	

Abstract from A. R. Cox presentation at ASME Gas Turbine Power Conference, Detroit, March 18-21, 1957.

Arnold B. Newell Discusses the New P&H Connecting Rod and Piston Assembly

I BELIEVE the Harnischfeger Corporation has made one of the most radical departures from the conventional connecting rod and attachment to the piston that has ever been made. At any rate the new design is of great interest for it employs a basic principle hitherto unused in diesels in which crankshafts are employed. In place of the conventional solid forged connecting rod a hollow tube is used. It is snugly fitted in a round hole in the top of the crank box and silver soldered in place. The top end of the rod carries a disc like element with a top mushroom which in turn supports a saucer shaped bearing element riding in a matching half that bears against the inside of the piston carrier with a disc in between. The accompanying exploded view shows the various components. Assembled in the piston they are held in place with a keeper ring. Since the P&H diesel is of 2- cycle design, the compression and working pressures are constantly downward.



When the piston is assembled the connecting rod is free to swing in all directions. The mushroom connecting rod and piston assembly and the way it works is quite obvious. Weight of the connecting rod having been greatly reduced, the kinetic energy is accordingly cut down and at an operating speed of 1800 rpm this is important. The saucer shaped bearing has about 2¼ times the area as that of a conventional wrist pin bearing. Since the piston floats on the bearing, wear must be uniform.. The bearing material of special alloy is self polishing. An abundant flow of lube oil comes up through the hollow connecting rod and flows into the oil grooves. It is also an effective coolant. Since the piston is free to rotate in the cylinder it is not relieved on the sides. Accordingly it wears round and in so doing tends to maintain perfect roundness of the cylinder. It is equipped with one scraper ring and a stopper ring at the bottom of the skirt. Holes for drainage of oil are drilled through the skirt of the piston between these rings.

There are several features that seem very obvious. A piston making full contact with the cylinder wall carries away more heat than one making part contact. It provides better heat dissipation. Since the piston may rotate freely and in this way maintain perfect roundness of the cylinder, the ring fit should not change and in that case ring life should be prolonged. Better functioning of the rings is always accompanied by a better rate of lube oil consumption and I have been told in the field that the rate of consumption shows progressive improvement with running of the engine. Two other changes in the P&H diesel deserve mention. One of these is the use of sodium cooled valves and the other is an arrangement of cooling fins in the cooling water surrounding the valve guides to provide more effective heat dissipation.

While the design of connecting rod and manner of attaching it to the piston is intensely interesting, it appears to be confined to use in 2-cycle engines because in the engines of 4-cycle type, the top half of the wrist pin bearing does some work and in this design provision is made for work in only one direction. This seems to be adequate. As a matter of fact I know of a number of cases where engines of 2-cycle type ran with excessive clearance at the top and bottom ends without knocking. Wrist pins and top end bearings over the years have been a "problem child." In recent years the problem has been pretty well solved. Obviously the engineering fraternity will watch the outcome of a design dispensing with the wrist pin.

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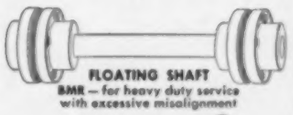

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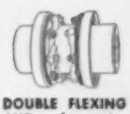

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WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **BERNARD W. LANSDOWNE**

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C., Ltd., Southall, following which he served some five years with that company's sales engineering department. He entered technical journalism as assistant editor of "Gas & Oil Power" in 1950 and was appointed editor in 1952.

A Lister-Blackstone Dual Fuel Design

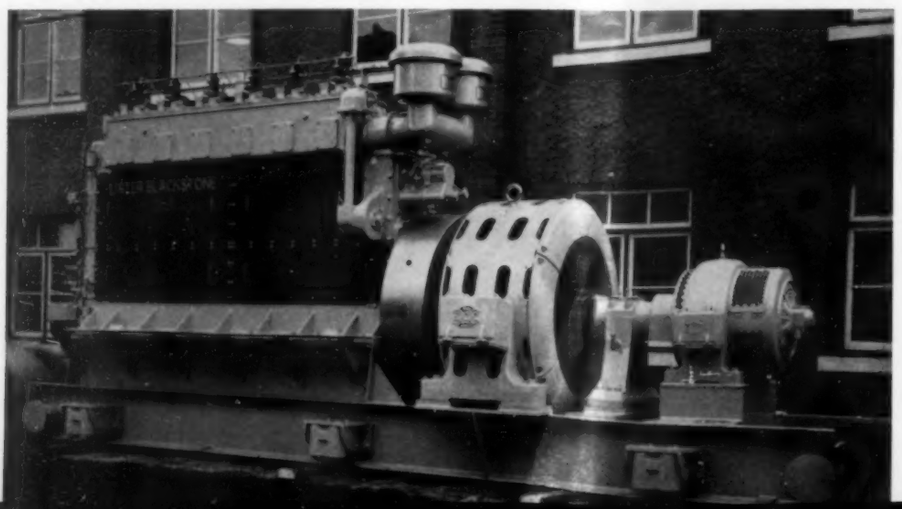
FOR some years now it has been the custom for exhibitors at the famous West of England Bath and West Agricultural Show to take electrical power and hot water supplies from a special transportable diesel power house on the show site. The generating equipment initially consisted of three 400 kw diesel-alternator sets supplied by R. A. Lister & Co. Ltd. of Dursley, Gloucestershire, and these were sufficient to supply the lighting, heating (from waste heat recovery equipment) and power throughout the 80-acre show grounds. This year, in order to provide greater flexibility and to demonstrate the possibilities of obtaining electrical supplies from gas fuels, a dual fuel engine-driven alternator has been incorporated in the plant. This is a new design by Lister-Blackstone and is the first dual fuel engine produced by the company.

The prototype unit known as the EVDF6 has six cylinders of 8.75 in. bore by 11.5 in. stroke and runs at 600 rpm. In this particular installation it is connected to the local public town's gas supply to give an output of 220 bhp, or 150 kw from the generator. On diesel oil the corresponding figures are 270 bhp and 185 kw. The engine is designed either for straight diesel operation or for operation on gas fuel with a small percentage of diesel fuel to initiate combustion. In general basic design, of course, the dual fuel and conventional diesel engines are the same. The main modifications provide for the admisison to the cylinders of a correct gas/air mixture and an accurately timed and metered quantity of diesel fuel. In this new design, since the engine air starting equipment is not required once the unit has been started on diesel oil, use is made of the air starting manifold and air start non-return valves in the cylinder heads for the admission of the gas for dual fuel operation. The engine, therefore, is not complicated, with either an additional gas manifold or extra inlet valves.

A further feature is that, in addition to the standard fuel pumps provided for diesel running, a second set of smaller pumps is also fitted to meter the small quantities of fuel required when operating on gas. Both the main and auxiliary fuel pumps deliver to a common injector nozzle in each cylinder head thus enabling heads of standard design to be used. The auxiliary fuel pumps are mounted over the air inlet manifold and work in conjunction with a secondary camshaft which is gear-driven from the main camshaft at the flywheel end of the engine. This secondary shaft is also used to operate the valve gear for the gas inlet-cam-air start non-return valve in each cylinder head. On straight diesel operation the engine working parts and governor control are identical to those of the standard Lister-Blackstone oil engine. On changing to gas operation, however, the main fuel pumps are isolated and lubricating oil is pressure fed to two servo cylinders. These open the auxiliary fuel pump racks to a pre-set stop and open the main gas valve to admit gas to the engine. Thereafter the engine power and speed are determined by the settings of butterfly valves in the air and gas manifolds. These valves are controlled by a hydraulic booster operated from the engine governor.

Close-up view of the governor gear showing the control to the hydraulic booster and the main gas valve.

View of the Lister-Blackstone Dual Fuel engine direct coupled to an Electric Construction Company's alternator. The arrangement of the drive from the main camshaft to the secondary camshaft which operates the auxiliary pumps and valve gear when the unit is running on town gas can be seen also.



The nominal rating of the new Lister-Blackstone dual fuel engines is the same as the equivalent straight diesel. It will be appreciated, however, that the potential output of a dual fuel engine depends upon the calorific value of the fuel used and on town's gas of 450 to 470 btu's calorific value, the normal output is reduced 20%. For dual fuel operation the engine on full load requires approximately 6,300 btu's per bhp per hr from gaseous fuel, the volume depending upon the calorific value of the fuel. The fuel oil consumption is approximately 7 to 10% of that for an equivalent straight diesel engine.

West Coast News

By **James Joseph**

PACIFIC Fish and Trading Co. has purchased from Hamilton Engine Sales, Inc., Portland, Ore., five new Capitol hydraulic reverse and reduction gears for marine applications.

TO Tacoma's Woodworth & Company, Inc., a GM model 3055C fan-to-flywheel unit for their Model 34 Lima shovel. Sale via Seattle's Evans Engine and Equipment Co., Inc.

FOR San Diego's National Steel & Shipbuilding Corp., a Fairbanks-Morse model 38D8-⅛, 6 cylinder, 960 hp marine diesel engine.

MEXICO City's Comision Federal de Electricidad has taken delivery of a 12 cylinder, model 38D8-⅛, 1920 hp basic Fairbanks-Morse diesel.

FOR their beach seiners operating Alaskan waters, Pacific American Fisheries has purchased five model 43200 GM 4-51s, replacing gasoline engines.

THE purse seiner *Vernon*, owned by R. J. Svorinich, Seattle, has repowered with a GM 6-110 diesel engine.

TO TOOL Equipment Rental, Inc., El Cerrito, Calif., two 4 cylinder, 95 hp model 49B4½ Fairbanks-Morse diesel engines.

FOR use in their log loading machine, James Bros. Logging Co., Springfield, Ore., has purchased a new 13-CK Torcon Converter.

SEATTLE'S Inland Petroleum Co., by installing a GM 6-71 turbocharged diesel in their Kenworth rig becomes its area's first trucker to road the new turbo model.

A GM model 3055C industrial engine (Enclosed Power Unit) has converted a steam pile driver to dieselization for Snohomish County Road District No. 3, in Washington state.

SAN Leandro, Calif.'s Western Electric Co. has taken delivery of a Fairbanks-Morse 45C4-⅛, 10½ hp diesel generator.

DELIVERY to Guntert and Zimmerman Construction Division, Inc., Stockton, Calif., of a Fairbanks-Morse model 49B4½, 180 hp, 6 cylinder diesel engine has been reported.

A GM model 4071-B, 4-71 series (aluminum) has replaced gas engine in a beach seiner owned by Cordova, Alaska's Western Fisheries Co.

ANOTHER GM diesel, this a 4-51 series, will power a beach seiner being built for Pacific American Fisheries at Seattle's Tripple and Everett Ship Repair yards.

FOR the yacht *Valkyrie*, owned by Berg Marine Service, Seattle, two GM 6-110s replacing a pair of 6-71s. *Valkyrie* is a 104-footer.

REPORTED from the University of California at Berkeley, a possible new fuel source: algae, the world-plentiful single-cell green plant common to stagnant ponds. Decaying algae's methane gas output has, for the first time, been captured in small quantities.

FOR Commercial Ship Repair Co., Seattle, a GM model 6058C fan-to-flywheel unit to power a pile driver's jet pump.

TO SEA Boat Co., Costa Mesa, Calif., two Fairbanks-Morse model 45B3-⅛, 5¼ hp diesel engines.

TO SAN Francisco's American Independent Oil Co., a Fairbanks-Morse model 38F5¼, 4 cylinder, 300 hp generating set.

Marquette Governors control power on first towboat with GM *Turbocharged* Diesel Engines

Pictured above is the "Cypress", first river towboat to be powered with the new General Motors Model 498 Turbocharged Diesel engines and the most powerful river boat to be built in the Gulf Coast area.

The two 12-cylinder engines, each developing 2100 brake horsepower, are regulated by Curtiss-Wright Marquette Governors. The pilot can rely on these accurate governors for *dependable* regulation at all times, regardless of operating conditions.

We'll be glad to help solve *your* problems of power control—on land or sea.

Other Marquette Products: AIRCRAFT WINDSHIELD WIPERS—PRECISIONSPRING CLUTCHES—ANTI-FRICTION BEARING TEXTILE SPINDLES—PRECISION PARTS AND ASSEMBLIES—ROTARY OIL PUMPS

MARQUETTE DIVISION
CURTISS-WRIGHT
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Northeast Diesel Notes

By Arnold B. Newell

Editor's Note. *Arnold Newell's latest field jaunt has taken him through the Midcontinent west of the Mississippi and for that reason his news notes this month cover unusual and important diesel applications observed on his last swing into the field for DIESEL PROGRESS. Next month he will be back in his Northeastern surroundings.*

IN THEIR new 15,000 sq ft sales and service facilities on a nine acre plot, the Chiles Tractor and Machinery Company on the outskirts of Springfield, Missouri, are doing a nice stroke of business in diesel driven equipment. On one order from the Gillioz Construction Company of Nonett, Mo. they sold the following Allis Chalmers equipment; One HD 16 and two HD 16 A dozers powered by 150 hp Allis Chalmers diesels and three Model 315 cable scrapers for use with the dozers. Also two TF 360 motor scrapers with A-C 280 hp diesels driving them.

KARL Schmitt of Springfield, Mo. who formerly built ponds on stock farms has gone in for highway construction and just bought a Model 45 Allis-Chalmers motor grader for this work from Chiles Tractor & Machinery Company.

FELIX Sisson of Tulsa, Oklahoma specializes in building underground gas storage systems in the East. For this work he bought an Allis Chalmers HD 16 A dozer from Chiles Tractor & Machinery Company of Springfield, Missouri who made delivery to New York with one of their own trucks.

DIEHL Karelskint of Fort Scott, Kansas does custom farm work such as pond building for stock watering, underground silos, drainage systems, fish ponds, etc. He has just added an HD 16 A Allis Chalmers dozer to his equipment. A similar purchase for the same class of work was made by Williams Brothers of Verona, Missouri, both sales having been made by Chiles Tractor & Equipment Co. of Springfield, Mo.

THE D. C. HALL Transport Company of Fort Worth, Texas, has just added 50 new Reo Cabover tractors to its fleet serving Texas, Oklahoma, Tennessee, Louisiana and Mississippi. One of these new 225 hp Cummins diesel driven units made a routine run from Dallas to New Orleans in 14½ hours typifying the fast transport service provided by the line.

DEALERS in farm equipment in the Southwest report that the "millionaire ranchers" have turned to the use of diesels in Texas to a point where they are outselling other power in mechanized implements. They are also large purchasers of diesel driven well pumping units and irrigation pumps driven by diesels. Fuel economy is said to be a strong factor influencing the current upsurge in diesel applications.

THE McCullough Tool Company has purchased a 3-cylinder P&H diesel and 40 kw generator for installation in the vessel *Queen of Texas*. Engine sold by Desco of Houston.

THE executive yacht *Caprice* owned and operated by the McEvoy Tool Company of Houston, Texas is being repowered with two P&H 4-cylinder diesels rated 145 hp each at the Platzer Shipyard, Houston. Diesel Engine Sales Company of Houston took the order.

A GASOLINE engine is being replaced in a hole borer working on foundations for the Dallas-Fort Worth, Texas Turnpike. The replacement is a P&H 80 hp diesel. Sold by Harnischfeger in Dallas.

THREE new automotive type 487 C P&H diesels have been sold to replace gasoline engines in three cross country tractors for operation by Prother Truck Line of Dallas, Texas. Harnischfeger Dallas Branch made the sale.

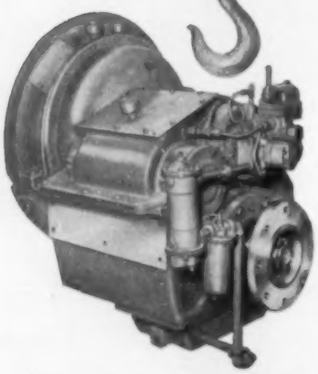
THE C. J. Simpson Trucking Company of Dallas in general trucking service has repowered an International truck with a Cummins JT6 diesel, sold by Cummins Diesel Sales & Service of Dallas.

ALL automatic drive and a brand new Cummins JT6 just installed in one of their trucks speeds up transportation of produce from the coastal area to Dallas, Texas for the Jack Stewart Produce Company of Dallas. They bought the new power unit from Cummins Sales and Service of the same city.

A CONSTANT Voltage to load 150 kw generating set driven by a D337 Caterpillar diesel has been purchased by Pit Sand & Gravel Company of Wichita Falls, Texas to furnish power at their plant. Darr Equipment Company of Dallas made the sale through their Wichita Falls branch.

THE TEXAS A&M College has started a school for the training of operators of

HOOK THIS TRANSMISSION TO YOUR NEW DIESEL FOR...



POWER WITH A PLUS

Here's really smooth power transmission. The new S-N 3900 Series hydraulically actuated marine reverse-reduction gears . . . engineered especially for high-speed, heavy-duty diesel engines . . . simple in design with equal life at full power and full speed in engine or anti-engine rotation. No clutch adjustment is necessary during the life of the clutches. All accessories are outside gear housing for easy servicing or replacement. The greatest choice of reduction gear ratios to give your boat greater efficiency. To get the most out of your diesel . . . get the facts on the two new Snow-Nabstedt reverse-reduction gears from 200 to 800 horsepower. See your S-N distributor or write for further information.

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Transmission Engineers
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THE SNOW-NABSTEDT GEAR CORP., HAMDEN, CONN.

SERVICE + PLUS

You can count on efficient, expert service for your Quincy Compressors from any of the more than one hundred Quincy Authorized Service Depots across the country. Adequate stocks of genuine factory parts are maintained for every model in the Quincy line. And because Quincy service people realize the importance of air power on your job, you can be sure of service-plus when you need it, where you want it. Depend on Quincy Compressors and Quincy service for all your needs from 1 to 90 CFM. Write Dept. K-56 for catalog today.

Quincy COMPRESSORS
FOR LOW COST AIR POWER
QUINCY COMPRESSOR CO., QUINCY, ILLINOIS

dieselized earth moving equipment at the urging of the Associated General Contractors and with the cooperation of equipment manufacturers. The purpose is to up-grade operators, not to train beginners. Experienced men are sent in for a week of intensive instruction in modern methods. Preventive maintenance is included in the instruction. The first of several schools was opened in Dallas with a class of 20. Equipment manufacturers as well as the AGC believe the schools will improve operating efficiency in the field and reduce costs of maintenance.

ALTHOUGH the constant heavy rains in Texas slowed the rate of sales and deliveries of diesel driven earth moving equipment, the Caterpillar Traxcavators and the DW 15 tractor scrapers are moving very well according to Darr Equipment Company of Dallas.

PAPSCO Incorporated of Fort Worth, Texas purchased a 150 kw generator driven by a D337 Cat diesel to supply power for operation of their rock crusher. The Ft. Worth office of Darr Equipment Co. made the sale.

THE McKNIGHT Construction Company, well known Texas road builders just purchased two Minneapolis Moline G.B. diesel tractors from Minneapolis Moline of Dallas for use in pulling compactors, road ploughs and other pull-behind equipment.

A NEW Machinery Mart has just been opened in Dallas, Texas for sale of dieselized construction and farm equipment and other machinery by Minneapolis Moline with Bob Moore in charge of retail sales.

J. E. COOK of La Porte, Texas has purchased four P&H diesels for installation in a towboat now building for lease to the Tennessee Gas & Transmission Company. Two of the engines are rated 200 hp for twin screw propulsion and two of 60 hp will drive 30 kw generators. Sold by Desco for Harnischfeger.

GM Hydrostarter Brochure

General Motors' new and improved Hydrostarter, which provides fast starts for diesel engines, is fully described in a new brochure just issued by GM's Detroit Diesel Engine Division. Copies may be obtained from Detroit Diesel distributors and dealers or by writing the Division, 13400 W. Outer Drive, Detroit 28, Michigan. (ITS NEW)

Industrial Catalog

A new condensed industrial catalog listing hose, fittings, Socketless kits, and self-sealing couplings, has been released by Aeroquip Corporation, Jackson, Michigan. Prepared for use in ordering Aeroquip parts, it contains information on the company's standard industrial products and is designed primarily for use in the replacement field. The catalog is an abbreviated version of the complete line Aeroquip Industrial Catalog. It includes instructions for ordering, installation planning and assembly of Aeroquip hose and fittings. Copies of the new catalog may be obtained by requesting Catalog Bulletin No. 182, Aeroquip Corporation, Jackson, Michigan. Aeroquip manufactures Flexible Hose Line, Detachable, Reusable Fittings, Self-Sealing Couplings, clamps, straps, load control and tie-down equipment for aircraft, industrial, farm, railroad, and marine applications.

Locomotives For Brazil

Brazil's Companhia Siderurgica Nacional, the largest steel mill in South America, has ordered approximately $1½ million of industrial locomotives from General Electric as part of a major plant expansion program. The order includes four wide-gage switcher-type 100-ton diesel-electrics developing 660 hp. They will be built by General Electric's Locomotive and Car Equipment Department here. The locomotives will be shipped in about eight months to the state-owned steel plant which is located in Volta, Redonda, about 60 miles inland from Rio de Janeiro.

The mill's present expansion will bring its production capacity to 740,000 tons of tin plate, sheet steel, structural steel and rail. The capacity has been 465,000 tons of finished products. Purchase of the new units is a step toward complete replacement of all of the steam locomotives now operating at the plant. The sales were placed through the International General Electric Company.

Variable-Frequency Generator

Easily adjustable by a simple hand crank, a high-cycle, variable-frequency motor-generator set, developed by Kato Engineering Co., Mankato, Minn., supplies alternating current output from 360 to 440 cycles per second. A unique double-motion variable-pulley drive arrangement on both motor and generator permits speed variance of alternator rotor while both machines remain stationary on mounting frame. Generator frequency is 400 cycles per second at 1714 revolutions per minute; 440 cps at 1884 rpm, and 360 cps at 1544 rpm.

The 400 cycle generator has an output of 30 kilowatts, three phase, 120/208 volts and is of the revolving field type. It has 28 field poles with excitation current supplied by a 1000 watt, 125 volt, direct current exciter, direct connected to alternator drive shaft. Motor is the induction type and operates from three phase, 60-cycle current. Overall dimensions are: height, 30 in.; length, 55 in.; width, 50 in. The entire unit weighs 1250 lbs. Controls for the unit can be incorporated in a free standing cubical or wall mounted cabinet or in a generator monted panel. (ITS NEW)

Sales Appointments

Mr. Thomas D. Hess and Mr. Norwood I. Glassey have been appointed to sales positions with the Hartford Machine Screw Company, the manufacturers of the Roosa Master fuel pump, according to an announcement by James J. Ford, Sales Manager of the Fuel Injection Division.

Mr. Hess will be a field engineer for the Company. He was employed by the American Bosch Arma Corporation, American Bosch Division from 1948 until 1956, the last four years of which were spent as a project engineer. He served two years in the U.S. Navy from 1944 to 1946, and is a graduate of Worchester Polytechnic Institute.

Mr. Glassey will be a Sales Representative located in Ann Arbor, Michigan and covering the Mid-West. He was formerly employed by the Fram Corporation in Providence, Rhode Island, from 1937 to 1956. Just prior to his leaving Fram, he was Assistant Sales Manager in the Washington, D.C. sales office.

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG,** Volume 22. This giant, 400 page, 10½" x 13½", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, Calif.

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a *complete*, easily installed, marine power and steering package

Harbormaster Outboard Propulsion and Steering Units are complete marine power packages, ready for immediate use. Everything is included . . . fuel tank, battery, steering mechanism, even the hold-down bolts. Mount, put in fuel, start, and you're off with exceptional power and maneuverability.

Harbormasters are rugged, powerful . . . *highly maneuverable* . . . and have wide application in shallow or deep water, for coastwise service as well as in harbors, lakes, canals, and rivers. They give you operational and economical features not found in ordinary marine power.

What can Harbormaster Outboard Propulsion and Steering do for you?

If you need easily installed power, better steering control, safety in shallow water, easier maintenance, more efficient performance, simpler hull design, more cargo space, bigger payloads, or simplified crew operation . . . Harbormaster is your answer.

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QUINCY 71, MASSACHUSETTS

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Please send me New Catalog giving details and showing many photos of Harbormasters in action.
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Mid-West Diesel News

By **L. H. Houck**

A NEW distributorship, McDonald Equipment Co., has been established in Little Rock, Ark., by Roy McDonald, well known in the heavy equipment field. Temporarily located at 115 N. Spring St., they will handle Koehring, Parsons, Kwik-Mix, Buffalo-Springfield and C. S. Johnson Co.

TRUCK Crane Co., Minneapolis, has repowered a model 185 Bay City truck crane with a 125 hp, NHCBI-400 Cummins diesel from Cummins Diesel Sales, Inc., Minneapolis.

COOKE Sales & Service, Fulton, Mo., recently delivered a 45 Allis-Chalmers motor grader to Calloway County and an HD-6 loader to Holland Clay Co.

VALLEY Steel Products Co., Louisiana, Mo., uses White diesel COE's for long hauls in delivery of steel pipe and other steel products.

ROY J. WINN, New Franklin, Mo., has a new Mack diesel tractor and is pulling Freightways trailers in a lease arrangement.

TRACTOR-trailer mail hauling under contract is proving popular with the P.O. Jack's Mail Service, Springfield, Mo., specializes in mail service, and uses several diesel tractors—an International on the Springfield to St. Louis run and a GMC tractor on one of the other runs.

ANHEUSER-Busch, St. Louis, has a fleet of diesel tractors for delivery to distributors—Internationals.

FABICK Tractor Co., St. Louis, with branches in Missouri and Illinois, has established a testing grounds and display yard on U.S. 66 west of St. Louis. Here they have enough room to demonstrate any of their products.

KNAUS Truck Lines, Kansas City, Mo., trailer at Pittsville, Ill., pulled by an International diesel tractor.

SEEN at St. Louis—H. J. Jeffries, Oklahoma City, with one of their big Kenworth rigs, powered with Cummins diesel, hauling jet engines from California under a transfer arrangement with Belyea Truck Co., Los Angeles.

ARNO Buerck, Perryville, Mo., has bought an Allis-Chalmers HD-6B for general contracting work from Ryan Equipment Co., St. Louis.

THE new Eimco crawler-type excavator and loader made by the Eimco Corp., Salt Lake, so widely used in underground mine operations, is powered with a GMC diesel. This new 143 hp rig can lift and load single pieces up to 12 tons.

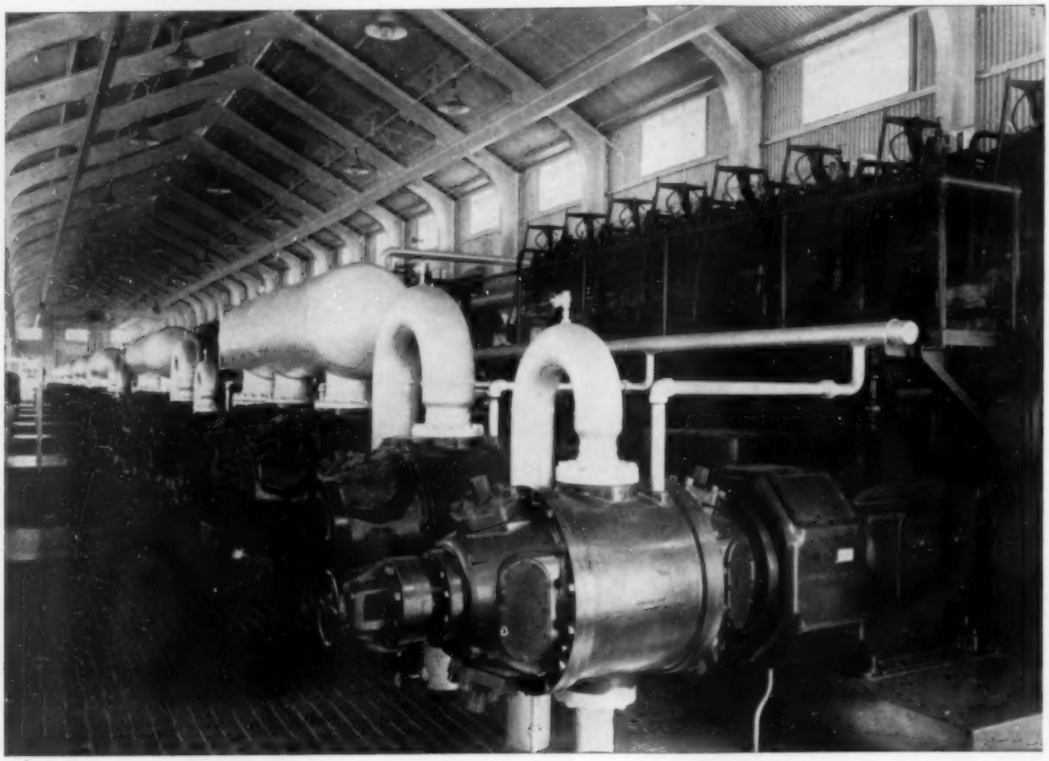
MIDLAND Tractor Co., Chillicothe, Caterpillar dealers, recently delivered a D8 Caterpillar to Walter Tietjens, a contractor at Brunswick, Mo.

BRINKER Tractor Sales, Florissant, Mo., St. Louis county, is showing the Case 800 crawler tractor which handles a 1½ cu yd bucket, and which can be used as a loader or a dozer. Power is an 80 hp Case diesel.

RYAN Equipment Co., St. Louis, has delivered an Allis-Chalmers HD-6G with new Buda Division diesel to J. T. Maloney, Webster Groves, Mo., for use in general contracting. Also a similar unit to Max Stovall, at Cape Girardeau, Mo.

CUMMINS Illinois Engine Sales, Chicago, has delivered a 300 hp NHRS-600 Cummins diesel to Chicago Bridge & Iron Works for repowering a 150 kw generator set on a portable welding unit.

Look to COOK for Better Rings!

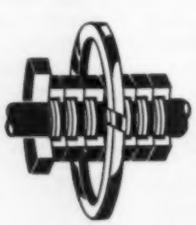


Cook packing and rings help keep compressors humming!

A well-known oil-producing company keeps this big lineup of Clark Bros. compressors running night and day in a West Texas gasoline plant. Keeps them running smoothly and efficiently, too — *thanks in good measure to C. Lee Cook packing and piston rings!*

Whatever type industrial equipment you operate, if it uses piston rings and packing, chances are good that it was Cook-equipped *when it was built.* That's why your best bet for continued trouble-free performance is to *keep it Cook-equipped.*

Your nearby C. Lee Cook representative will be glad to give you all the facts about precision-engineered Cook products. Why not talk with him soon? C. Lee Cook Company, 940 South 8th Street, Louisville 3, Kentucky.



C. LEE COOK COMPANY

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Rings and Packings Since 1888

CATERPILLAR No. 12 motor grader delivered to C. H. Akinson Paving Co., St. Joseph, Mo., by Midland Tractor Co., Chillicothe.

SEEN on U.S. 60 near Springfield, Mo. —Roadway Express with Mack diesel, Roadway Express with Cummins diesel and Lone Star Motor Freight, Dallas, with GMC diesel.

M. E. Gillioz Construction Co., Monett, Mo., recently placed two Koehring Dumptors in service. Engines are GMC and the units were purchased from Van Keppel, Kansas City.

LILY Cup Co., makers of the famous paper cup, with a comparatively new modern plant in Springfield, Mo., is using some GMC diesel powered tractors in its delivery fleet.

Tools For Turbocharger Overhaul

Service tools permitting field overhaul and repair of the Elliott M-5 and M-10 Turbochargers have been developed by Kent-Moore Organization, Inc., Jackson, Mich. The tools allow for complete overhaul, exclusive of rotor unit balancing, in any well equipped service facility, duplicating factory tolerances, fits, and finishes.

Because of differences in sizes and capacity, similar tools are offered for both the M-5 and M-10 Turbochargers, although the service operations are identical. Nine tools are applicable to each turbocharger: 1. Bearing Remover Adapter (for use with Slide Hammer). 2. Bearing Broach Sets, which include supports for holding bearing in place while the broach is forced through. 3. Bearing Installing Set. 4. Rotor Assembly, Lock, and Nozzle Ring Remover. 5. Shaft Pilot. 6. Turbine End Seal Reamer. 7. Blower End Seal Reamer. 8. Inlet Casing Puller. 9. Rotor Shaft End-play Spacer.

Finishing Process

Cratex Manufacturing Company, manufacturers of Cratex Rubberized Abrasives has issued an Application Case History which gives a new method to cut down the time, yet materially improve the polishing of crankshafts and camshafts for diesel engines. Specifically the case history covers the problem of attaining a 'high polish' so necessary when engines are overhauled and it also fits into the needs of manufacturers.

This problem, according to Cratex Engineers, has been successfully solved through Cratex Rubberized Abrasive Wheels in course and fine grit textures. Shafts are mounted between centers on an engine lathe. Cratex 4 in. Wheels are used on an air hand grinder mounted on Tool Post, operating at a speed of 2700 rpm. Course grit textures are used first and the fine grit textures are used as a final finish operation. No coolant is necessary. Actual Case Histories show that this operation is performed much faster with Cratex, produces a more highly polished finish with greater control of the polishing operation. This Cratex Application Case History No. 116 can be obtained without charge by writing to Cratex Manufacturing Company, 81 Natoma Street, San Francisco 5, California.

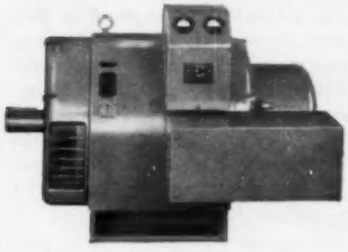
Centrifuge Bulletin

This new bulletin describes the De Laval Model AC-VO Nozzle-Matic Centrifuge. Used to separate, clarify, classify, or concentrate liquid or liquid-solid moisture high in solid content, this centrifuge continuously discharges all phases including the solids. The bulletin describes the applications for this machine and gives flow charts showing the various types of nozzle bowls available. For a copy write The De Laval Separator Company, Poughkeepsie, N.Y.

Get the latest!

A COMPLETELY NEW "PACKAGED" GENERATOR

AMP-PAK



AMP-PAK Generator shown is rated at 187 kva, 1200 rpm, 240/480 volts. AMP-PAK is available in ratings of 75 thru 187 kva at 1800 rpm and 62½ thru 187 kva at 1200 rpm. Three phase, 80% PF, 60 cycles, 50C rise, and 120/208, 240 and 480 volts.

No exciter... No moving parts in the voltage regulator

AMP-PAK is a compact, revolving field a-c generator with built-in, static excitation system; static voltage regulator; and basic metering and controls conveniently grouped. AMP-PAK is a portable unit, factory assembled, internally connected, and tested.

No rotating exciter to maintain. D-C excitation is provided by a heavy duty, long-life, static rectifier.

No tubes, relays, vibrators to service. Voltage is regulated by a static, E-M-developed sensing circuit and "magical" magnetic amplifiers.

Holds voltage "rock-steady" so your motors, lights, and electronic equipment will work better. The static regulator provides ±2% regulation.

Starts big motors. A special, built-in voltage booster transformer stands by to reinforce line voltage when heavy loads are suddenly applied.

Easy to install. Needs no switchboard. Just connect load to AMP-PAK thru a suitable line switch.

Simple to operate. Has no belts, no "tricky" commutator, no adjustments — anyone can operate AMP-PAK.

See your nearest E-M Sales Engineer and write the factory for publication PRD-236.

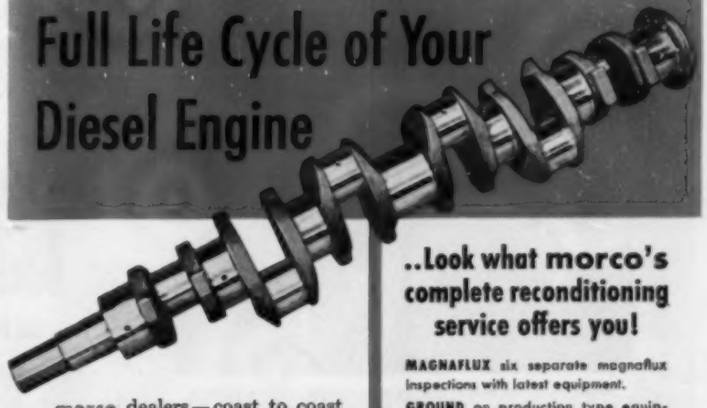
E-M

ELECTRIC MACHINERY MFG. COMPANY
Minneapolis 13, Minnesota

Largest manufacturer of "Packaged" Generators

2100-TPA-2154

morco Factory-Certified Exchange Crankshafts give Trouble-Free Operation for the Full Life Cycle of Your Diesel Engine



morco dealers—coast to coast—are stocked with reconditioned, like-new crankshafts for different diesel engine models. Users of Detroit Diesel and Cummins engines can exchange worn shafts for MORCO factory-reconditioned shafts through authorized dealers.

Why take chances? Let your dealer be your source for dependable, safe crankshaft regrinding. You get immediate service, guaranteed quality and terrific economy. Ask your dealer about MORCO today.

..Look what morco's complete reconditioning service offers you!

MAGNAFLUX six separate magnaflux inspections with latest equipment.

GROUND on production type equipment to engine manufacturers' specifications. Original stroke retained.

TOCCO* HARDENED by the original equipment method when necessary.

ROLLED FILLETS increase strength at the most critical areas.

DYNAMIC BALANCE restored on original factory balancing equipment.

THRUST COLLARS and surfaces restored.

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KEY WAYS restored.

DOWEL HOLES repaired.

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THREADS repaired.

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City_____ Zone____ State_____

Inland River Reports

By A. D. Burroughs

CHRISTENING ceremonies along inland waterways accounted for the get-together of many inland river personalities, plus enthusiasm for the new power-efficiency-beauty combinations found in the new diesel vessels.

THE downpour of rain at Joliet, Ill., failed to dampen enthusiasm at the christening ceremonies held for A. L. Mechling Barge Lines' new *Lynn B.*, the new 2560 hp towboat built by Dravo with power provided for main propulsion by Enterprise engines, model DMG-38.

COLORFUL civic and marine ceremonies set the stage for the new inland river power king, the 5400 hp *Mark Eastin* in mid-way at Paducah, Ky. Measuring 177 x 42 ft, service will be done for owners West Kentucky Coal Company, Madisonville, Ky., with power from two GM engines.

A NEW contender for the *Mark Eastin* king-title is the towboat under construction plans at Dravo for Sealy Power, Inc. This craft will have a power rating of 4200 hp from two Nordberg Supairthermal engines, with measurements of 200 x 45, larger in size than the *Eastin*.

THE *Craig M* shared christening ceremonies with the *Lynn B.* Measuring 148 x 34, with launching several months ago at Dravo, two Enterprise engines produce the same 2560 hp, Falk reduction gears, Gardner-Denver air compressors, Honan-Crane lube oil filters, Cuno lube oil strainers, Winslow oil filters and Thermxchanger lube oil coolers equip both towboats.

DECEMBER is the tentative reported date for the delivery of the *Lady Rose Mary* to owner Inland Oil and Transport Company (St. Louis) by builder Nashville Bridge Company. This planned 130 x 30 ft towboat will join the "lady fleet" of *Lady Mignon* and the well-known *Lady Linda*. Propulsion power is to be provided by twin GM (Cleveland) 12-567C engines.

WHITE'S Superior engines, model 40-S2x-8, will power the 1066 hp towboat under construction at the Hillman Barge and Construction, Brownsville, Pa., yards. To measure 118 x 27 ft, this vessel will be a sister craft to the active Superior-powered *Henry L. Hillman*.

AT St. Louis Shipbuilding and Steel Company, two towboats, measuring 120 x 27 ft, are under construction for U.S. Steel. The rated 1280 hp is to be supplied by Fairbanks-Morse engines.

THE third vessel for U.S. Steel being built by St. Louis Shipbuilding and Steel Company is a utility craft, 70 x 30 x 8½, with a total 600 hp furnished by two Caterpillar engines.

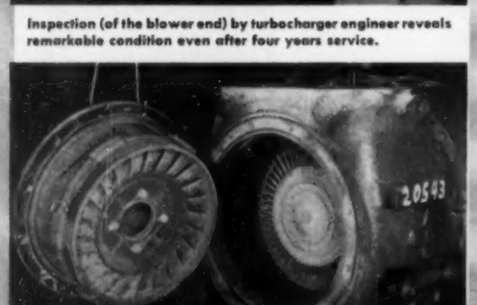
CALCASIEU Shipbuilding Corporation, La., has completed the 85 x 22 ft crewboat, *Horn Island*. Now in active service for owners Rudolf Shipping, Inc., New Orleans, power comes from the GM model 2061A engine.

ANOTHER Dravo project has been completed with five new diesel river towboats joining the Argentine government fleet. Three are rams, and two are the bigger 2400 hp towboats. The two larger vessels, named *Rio Parana* and *Rio Uruguay*, can handle 1000-ton barges with power furnished by twin Cooper-Bessemer engines rated at 1200 hp each.

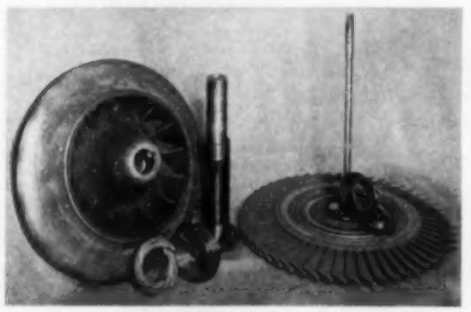
THE three rams built by Dravo for Argentine service are 70 x 20 ft each, equipped with Kort nozzles, the six rudder steering systems and produce 580 hp from their twin Atlas engines.

after 35,000 hours of service . . .
this ELLIOTT turbocharger
is still in good running condition
(It operated continuously—24 hours a day—for four years)

Inspection (of the blower end) by turbocharger engineer reveals remarkable condition even after four years service.



A view of the turbine end of the Elliott turbocharger shows only slight erosion on the turbine blades and nozzle ring.



After complete disassembly, inspection of the rotors revealed little or no evidence of wear on the journals, thrust faces, and bearings.

dependable operation
with ELLIOTT turbochargers!
for two-cycle and four-cycle diesel engines
175 hp and up

Here's what happens to Elliott-engineered turbochargers under continuous 'round-the-clock operation. Serving gas-engine compressors in a midwestern pipeline compressor station, this turbocharger was originally installed four years ago. When shut down and returned to the Elliott plant for inspection, it was found to be in good running condition after *35,000 hours of service.* This outstanding record of dependable service is further proof of Elliott's superior design and workmanship. That's why it pays to specify Elliott for all turbocharger requirements.

ELLIOTT Company
Turbocharger Department
JEANNETTE, PENNSYLVANIA

M7-2

TWIN Cummins engines, 210 hp each, supply the power for the 55 x 17 ft tug, *J. H. Revels*. This new fleet addition for the Revels Marine Towing Service fleet, New Orleans, was constructed as well as designed at Arnold V. Walker yard, subsidiary now of Ingalls Shipbuilding Corp.

WALT Gennette of Taylor Machinery Company, Memphis, Tenn., reports several sales and installations of interest. One of these is the new towboat, *John Morris*, twin-screw craft for the Patton-Tully Transportation Company, powered with two Caterpillar D397 Turbocharged engines, 500 hp continuous 1225 rpm with Snow-Nabstedt gears.

TAYLOR Machinery Company supplied the Caterpillar D375 turbocharged engine for the new dredge plant owned by Allen Ready Mix Concrete Company, Memphis. This engine, developing 325 hp continuous at 1200 rpm, is turning a Thomas Dredge pump, v-belted to the engine.

ON THE water is the *Sandra Marie*, the 85 x 26 ft towboat built last year by Christy Corp. for owners S & S Marine Towing Co., Joliet, Ill., with favorable reports coming in consistently regarding performance from the Kahlenberg Model E turbocharged engines.

THE *Bob Benter*, new Ohio River Company towboat powered with two Baldwin-Lima-Hamilton Model 606 SC supercharged engines, has been getting a share of applause for recent performances on the Ohio.

Weatherproof Recording Gauges

Recording gauges for pressure, vacuum, and water or liquid level measurements are now available in new weatherproof cases, according to a recent announcement by The Bristol Company of Waterbury, Connecticut. The new gauges are designed for wall or pole mounting outdoors, where it will be subjected to all types of weather. Measurements of water depth or other liquids can be accomplished with float-type, pressure-type, differential-pressure-type, or bubbler-type liquid level gauges; pressure gauges are offered in all ranges. Both 8 in. and 12 in. round chart models are available in the new cases; flowmeters and thermometers are also offered. The new cases are pictured and described in Bristol Bulletin L701, available on request.

Bulletin On Trouble-Shooting

If you are having trouble with a specific piece of equipment, what do you do?

A bulletin just released by the Service Division of Cummins Engine Company, Inc., Columbus, Indiana, recommends that first—you "think before you act." Then ask yourself these questions: (1) What were the warning signs preceding the trouble? (2) What previous repair and maintenance work has been done? (3) Has similar trouble occurred before?

The bulletin is entitled *Principles of Trouble Shooting for Cummins Diesels*.

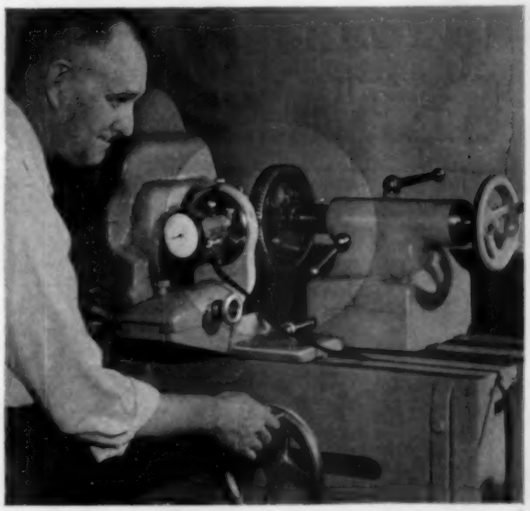
It is designed to unfold so that it can be used as a wall chart. On the chart complaints are listed and probable causes are noted. "Trouble shooting," according to the bulletin, "is nothing more nor less than an organized study of the problem and a planned method of procedure for the investigation and correction of the difficulty." The chart includes some of the most common complaints that may be encountered during the service life of a diesel engine. Copies may be obtained by writing the Service Division of Cummins Engine Company, Inc., Columbus, Indiana, or by contacting any member of the World Wide Cummins Distributor and Dealer network. (ITS NEW)

GM

DETROIT DIESEL PARTS

—factory-engineered for long life, low-cost service

Camshaft inspection—Close adherence to engineering specifications on every General Motors Detroit Diesel replacement part is maintained by routine checks with high precision instruments like this optical inspection gauge with a guaranteed accuracy in millionths of an inch.



Gear dimension control—Gear teeth shaving is measured precisely on the latest-type machines where tape recordings show the contours to an accuracy of one ten-thousandths of an inch.

Magnetic analysis comparator—Here the latest electronic testing equipment is used for a uniform, rapid method in checking metal parts for strength . . . customers' assurance of utmost dependability.

You're always money ahead when you buy factory-engineered parts from your Distributor or Dealer

GM GENERAL MOTORS DETROIT DIESEL POWER

DETROIT DIESEL

Engine Division of General Motors

Detroit 28, Michigan

Single Engines . . . 30 to 300 H.P. Multiple Units . . . Up to 893 H.P.

America's First Choice Diesel Engine

Mid-Continent Diesel News

By **Jack F. Cozier**

THE *Sea Doll* recently built by Gulf Master Shipyards, Slidell, La., for Joseph Brown and J. F. Dailey, Pascagoula, Miss., is powered with two Cummins NRT marine Turbodiesel engines. This crew boat is now in service for Shell Oil company ferrying crews to offshore drilling rigs. The *Sea Doll* is equipped with Columbian three in. blade propellers, Capitol hydraulic reduction gears, and has a 12 ft, 3 in. beam and draft of 36 in. The engines were furnished through Cummins Sales & Service, New Orleans, La.

CITY OF Oberlin, Ohio, has purchased a Fairbanks, Morse model 31AD18, 3500 hp, 10 cylinder diesel engine.

THOMAS Concrete Pipe Co., Ada, Okla., bought a model 604 Lima crane powered by a 671 GM diesel engine from R. A. Young & Son, Inc., Tulsa, Okla., for use in their concrete pipe plant operation in Ada.

CITY OF Falls City, Nebraska, purchased a Fairbanks, Morse 3500 hp, 10 cylinder model 31AD18 dual fuel generating unit.

KERR-McGEE Oil Industries, Oklahoma City, Okla., recently purchased four D-337 F Cat marine electric sets with switchgear and distribution system from Hoover Equipment Co., Oklahoma City, Okla. These units will power two work boats for use in Venezuela.

CUTTER Electric Co., Lexington, Kentucky, has bought a Fairbanks, Morse 5 cylinder, model 38F5¼, 412 hp diesel generating unit.

CONSOLIDATED Oil Well Services, Chanute, Kan., took delivery on a GM 6110 diesel power unit to drive a 48P oil well pump for oil well servicing. The sale was made by Diesel Power Co., Tulsa, Okla.

La CROSSE Dredging Corp., Chicago, Ill., purchased a six cylinder, 960 hp model 38D8-⅛ single rotation marine diesel engine from Fairbanks, Morse & Co.

FRANK Poston Construction Co., Oklahoma City, Okla., bought one model 160 Buckeye ditcher powered by a Cat D318 diesel engine from R. A. Young & Son, Inc., Tulsa Okla., for a sewer job in Oklahoma City.

VILLAGE of Waterville, Ohio, took delivery on a Fairbanks, Morse 10 cylinder, 1600 hp, model 38DD8-⅛ dual fuel diesel engine.

M. E. STEWART & Son, Dewey, Okla., has purchased a Lima model 44 shovel powered by a GM 471 diesel engine with Allison torque converter. The sale was made by R. A. Young & Son, Inc., Tulsa, and it will be used in Stewart's quarry operation.

CITY of Northwood, North Dakota, has bought a Fairbanks, Morse 1600 hp, 10 cylinder, model 38D8-⅛ opposed piston diesel engine.

SOUTHWEST Metal & Trade Co., Altus, Okla., has installed a Cat D-315 G diesel engine from Hoover Equipment Co., Oklahoma City, Okla., for use in a Northwest dragline.

SHEEHAN Pipeline Construction Co., Tulsa, Okla., has received a GM model 4150 80 kw diesel generating unit driving Lincoln electric welders. The unit which was sold by Diesel Power Co., Tulsa, will be put into service near Richmond, Ind.

CANYON Trucking Corp., Midland, Tex., received a Kenworth with a NH-

Out of Thompson's A

Simulated service-condition lab test of Thompson Turbocharger to determine capacity under varied loads and temperatures.

6-B Cummins diesel engine. Canyon has six Cummins powered trucks on duty with a seventh Cummins powered unit on order.

PECOS Dairy Distributing Co., Pecos, Tex., operates a Kenworth CA-521 tractor utilizing the power of a Cummins HRFB diesel engine in their daily haul from Dallas into West Texas.

BLUE WATER Drilling Co., New Orleans, La., Offshore Rig #1, has taken delivery on two Cat D-397 Turbocharged 350 kw electric sets with switchgear and distribution system from Hoover Equipment Co., Oklahoma City, Okla.

R. R. TWAY Construction Co., Oklahoma City, Okla., purchased a Lima model 44 crane from R. A. Young & Son, Inc., Tulsa, Okla. The unit powered by a 471 GM diesel engine will be used on a bridge job near Sayre, Okla.

GEORGE R. Bentley Construction Co., Grandfalls, Tex., recently purchased three International Harvester trucks, one powered by a Cummins HRFB-600 diesel and the other two powered by Cummins JT-6-B Turbodiesels. Bentley specializes in oil field construction and private road building.

CITY of Roodhouse, Ill., bought a Fairbanks, Morse 960 hp, six cylinder, Model 38DD8-1/8 dual fuel diesel generating unit.

Filter Bulletin

A new 16-page bulletin illustrating and describing Nugent Laminated Fiber Disc Filters has been issued by Wm. W. Nugent & Co., Inc., 3440 Cleveland Street, Skokie, Illinois. The bulletin provides complete information on the design, construction, specifications and capacities of standard, high pressure and duplex models. Also included are special purpose assemblies, accessories and valuable installation data. A copy may be secured by writing the company. Ask for Bulletin 7C.

Phase-Voltage Changer

A new type rotating electrical machine which changes both phase and voltage has been developed by the Kato Engineering Co. of Mankato, Minn. The machine converts single-phase, 115-volt, 60-cycle alternating current to three-phase, 230-volt, 60-cycle current. Frequency is held constant within a fraction of a cycle from no load to full load. The machine is conservatively rated at 500 watts. The converter weighs only 37 lbs with both frame and endbells cast from a durable aluminum alloy. Steel bearing wells are set into endbells.

The unit is 8½ in. wide, 9 in. high and 10 in. long. Relay starting switch, starting capacitator, input and output receptacles can be mounted in a small box on the converter, at a separate station, within a new type converter frame, now being developed, or within a housing that eliminates all operating noise. The machine is quiet running, grease sealed ball bearings having very little noise.

Intake and exhaust air vents are located in bottom halves of endbells, making the unit drip proof. Other models and sizes, now in the engineering stage, will include sleeve-type bearings to eliminate noise with various input and output voltages available. (ITS NEW)

's Aerodynamics Laboratory...

NEW THOMPSON TURBOCHARGER

simpler design, easier to service, longer life

New Thompson Turbocharger for diesel engines up to 500 horsepower combines maximum supercharging effect with a simple rotor design. Problems encountered on other superchargers with oversize shafts, split bearings, and complex diffusers are eliminated on the Thompson Turbocharger.

This new design of supercharger turns at lower speed, yet provides ample compression to meet your supercharging requirements.

For over a half-century, Thompson has been a leading designer and producer of automotive parts. This experience has been combined with our leadership in aerodynamic engineering, to produce the most efficient and simplest design of turbocharger now available for automotive-type diesel engines.

Several sizes of Thompson Turbochargers are available to supply air augmentation for diesel engines up to 500 horsepower. Engineers from the Jet Division will be glad to work with you in providing a Thompson Turbocharger for your present engine design.

This data booklet DPE-157 contains information to help you equip your engines with Thompson Turbochargers. Write for it on your company letterhead.

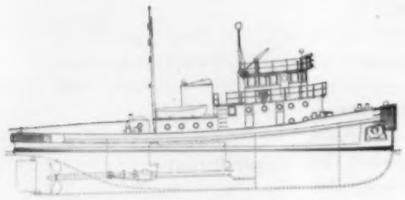
JET DIVISION

Thompson Products, Inc.

CLEVELAND 17, OHIO

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG,** Volume 22. This giant, 400 page, 10½" x 13½", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company order forms to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, California.

Engines For New Tugs



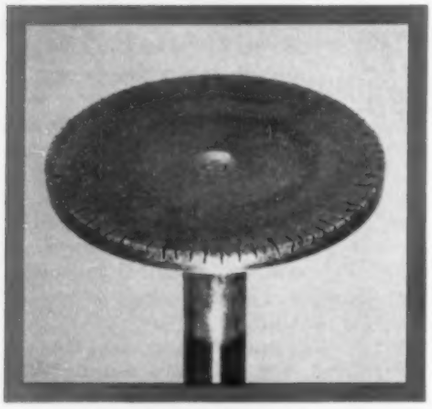
Foss Launch & Tug Co., Seattle and Tacoma, Washington, will soon add two new 90 ft tugs to its present fleet of tugs. The new tugs were designed by H. C. Hansen, Naval Architect of Seattle, and are now being built at the Todd Shipyards in Seattle. These tugs are a new class to be used primarily for shipdocking and general towing service. They will be ready for operation in the waters of Puget Sound by early Fall. Each of the single screw tugs will be powered by a direct drive, direct-reversing Nordberg Supairthermal diesel marine engine. The four-cycle, in-line engines have eight cylinders of 13 in. bore and 16½ in. stroke and are rated 1200 shp at 310 rpm. They will operate at 174# bmep.

The first Nordberg Supairthermal engine to be placed in marine service was purchased by Foss Launch & Tug Co. in October 1950 for the *Brynn Foss*. The performance of this 800 shp, six cylinder, 13 in. bore engine, which operates at 160# bmep, lead to the purchase of these additional engines. Another Foss tug, the *Duncan Foss*, is powered by a Nordberg six cylinder, 9 in. bore engine, rated 400 shp.

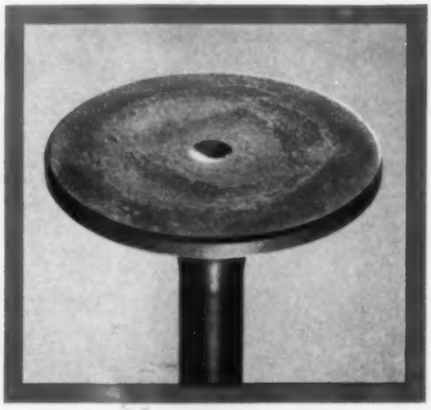
Accelerated Engine Test Comparison Proves

EATON SUPER-ALLOY VALVES LAST MANY TIMES AS LONG

AS VALVES MADE FROM COMMONLY USED ALLOYS



COMMONLY USED ALLOY
Failed at Less than
600 Hours

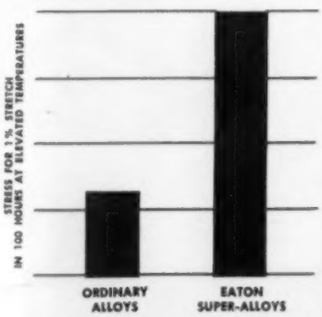


EATON SUPER-ALLOY
in Excellent Condition
after 3000 Hours

To meet the requirements of extreme heavy duty service, Eaton has developed unique production methods for the making of exhaust valves of super-alloys possessing exceptionally high hot-strength and corrosion resistant properties. These Eaton Super-Alloy Valves are "custom tailored" to meet the specific requirements of the engines for which they are designed.

As a pioneer in the development of valve designs and materials which have added thousands of miles to valve life expectancy, Eaton has made such important contributions as sodium cooled valves, seat-faces of high-alloy materials, aluminized valves, and now super-alloy valves.

If you build engines—either gasoline or diesel—for heavy duty applications such as motor trucks, buses, earth moving machinery—it will pay you to discuss the advantages of Eaton Super-Alloy Valves with our engineers.



The results of laboratory tests represented by the above graph indicate the superior hot-strength of Eaton Super-Alloys over commonly used exhaust valve materials.

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PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps Motor Truck Axles • Permanent Mold Gray Iron Castings • Forgings • Heater-Defroster Units • Automotive Air Conditioning Fastening Devices • Cold Drawn Steel • Stampings • Gears • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Witte Chief Engineer

John M. Smidl

The appointment of John M. Smidl as chief engineer of the Witte Engine Works of United States Steel's Oil Well Supply Division was announced recently by K. O. Nilsson, general manager of the Kansas City plant. Witte Engine Works designs and manufactures diesel, gasoline and gas engines for the oil country, general industrial and farm use. Mr. Smidl joined "Oilwell" on October 1, 1956 as assistant to the general manager of the Witte plant. Prior to his employment by U. S. Steel he had been associated with Electro-Motive Division of General Motors Corporation since 1939. The new chief engineer received his degree in Mechanical Engineering from Purdue University, Lafayette, Ind. He is a member of Pi Tau Sigma engineering honorary society and the S.A.E. He was a pilot during World War II, serving three years with the U. S. Air Force.

Diesel Drives Crusher

Copper State Construction Co., Mesa, Ariz., is just completing a 38,000-ton crushing job with this Cedar Rapids crusher to supply stone base for 4½ mi. of new Highway 77 from Mammath toward Oracle. The International UD-1091 diesel unit is the sole power for this crusher plant—crushing 1-in. max river bed gravel at 350 tons per hr.

A Pretty Powerful Punt

An interesting small dredge tender has been built by Gladding-Hearn Shipbuilding Corporation of Somerset, Mass. for Surinaamschie Bauxite Maatschappij which is a subsidiary of the Alcoa Steamship Company. It has been delivered to ship side at

Bush Terminal, Brooklyn, N.Y. for transportation to Surinam, Dutch Guiana where it will tend a 24 in. hydraulic dredge employed in the mining of Bauxite. Named *Onoribo*, the boat is 40 ft long, 14 ft wide and 6½ ft deep. It is powered by a 150 hp Caterpillar diesel driving a 42 in. by 32 in. Federal propeller through a 3:1 Capital hydraulic reduction gear and a 3 in. monel metal shaft.

Construction conforms to ABS rules using ¼ in. shell plating, ¼ in. floor plate on deck, and transverse framing on 20 in. centers with web frames or bulkheads on every fourth frame. The skeg is hollow to accommodate the reduction gear and was filled with cement where inaccessible for maintenance. An unusually full bow was designed to accommodate heavy deck loads required in tending the dredge. The *Onoribo* is fitted with pushing knees forward and heavy bitts aft. An open pilot house amidships allows her to be operated by one man. During trial runs on the Taunton River the vessel made 8.3 knots.

New Cooper-Bessemer President

Eugene L. Miller

Upon recommendation of L. F. Williams, board chairman and former president, the Directors of The Cooper-Bessemer Corporation elected Eugene L. Miller its new President and General Manager. At the age of 38, Mr Miller becomes the youngest president to head this 124 year old engine and compressor building firm. The election to presidency recognizes the capable direction Mr. Miller has given the Company since his elevation to the position of Assistant General Manager in 1954, Mr. Williams points out. Since that time he successfully directed the policies of the company to achieve what is the most productive and most profitable period in the corporation's long history. During this period he has initiated a development program of new company products for the petroleum and petrochemical fields, as well as an important expansion in the Company's manufacturing facilities to meet the rapidly growing demand for compressors and engines.

A graduate of Oklahoma A & M College, Mr. Miller holds a Mechanical Engineering degree. He was associated with Mid-Continent Petroleum Corporation before joining the armed services in World War II, where at the age of 25 he became a Lt. Colonel in the U. S. Army Corps of Engineers. In 1946 Mr. Miller was project engineer for Cooper-Bessemer, the position he held until 1954, when he was elected Assistant General Manager. Shortly after that the Board of Directors elected him General Manager, the post he has held for the past 18 months, in which he has headed the over-all operations of the Company. President Miller has reported net profits of $1,310,459, or $2.01 a share for the first quarter of 1957 on shipments of $18,337,227; compared with net profits of $529,732 or 81 cents a share on shipments of $10,810,753 for the same period in 1956. The shipments for the first quarter of 1957 exceeded by 23% and profits by 87% the best previous first quarter in the Company's history.

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HOSE and FITTINGS
IGNORE VIBRATION
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For trouble-free fuel, air, oil and hydraulic systems, depend on Stratoflex flexible hose and reusable fittings. Stratoflex hose and fittings are designed for diesel, automotive and general industrial applications where vibration, flexing, corrosion and abrasion are problems. A wide range of sizes and types assures you of exactly the right hose and fittings for your specific requirements. Stratoflex leak-proof reusable fittings simplify maintenance by making possible quick, easy replacement or modification. You solve both design and maintenance problems when you specify Stratoflex.
TYPICAL ASSEMBLIES
SF 225 SINGLE WIRE BRAID HOSE with SF 323, 324 REUSABLE SWIVEL FITTING for fuel, air, oil, water, hydraulic, LP-Gas, anti-freeze and other fluid lines where superior resistance to abrasion and corrosion is required.
SF 205 STAINLESS STEEL WIRE BRAID HOSE with ALL BRASS SF 323 REUSABLE SWIVEL FITTING for medium pressure applications where extra resistance to corrosion is required. Especially suited for marine uses such as offshore drilling rigs.
SF 212 DOUBLE WIRE BRAID HOSE with SF 320 REUSABLE SWIVEL FITTING for high pressure applications. Working pressure range: 1,125 to 5,000 psi.
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Diesel Farm Notes

By F. Hal Higgins

DAIMLER-BENZ'S Unimog 30 diesel has just completed the Nebraska Test at Lincoln with a sea level maximum hp of 26.57 drawbar. Engine was same make of type 4 cylinder. This 4-wheel drive tractor is now ready for the U.S. market.

J. I. CASE Company's 301 diesel also got its Nebraska test last April and rated 29.40 hp at sea level. Engine was a Continental type 4 cylinder model.

FARM, park and road maintenance tractors are getting the "acid test" in bigger and bigger doses, according to figures just released by the Chemical Specialties Manufacturers Association. Nearly 17 million gallons of liquid and more than 7 million lbs of powder insecticides were sold in the U.S. last year to keep humans ahead of the bugs. This does not include the tremendous amounts of fertilizers powered by diesel tractors on farms, orchards, plantations and ranches. The diesel tractor is the power on most of this material not handled from planes.

DIESEL engines are appearing on most of the combined harvesters offered the European farmer this year, according to a survey by *Farm Mechanization*. The list of 13 makes in production included International Harvester, Massey-Harris, Allis-Chalmers, that are well known in the U.S. but which have factories in Europe. Both International and Massey-Harris offer choice of diesel on one model. Allis-Chalmers has its Gleaner-Baldwin self-propelled model with diesel. Lanz, Deere & Co's. German branch, offers three of its four models with its own diesel engines. Claas, another German Company, offers two of its three models in diesel. "GM4" and "Combi" from Mitchell, Coleman & Co., are both diesel. Ransomes, Sims & Jeffyres, famous plow builder of 160 years activity, offers three combines with its 12-ft model diesel. One of the Fahr models from Germany is diesel powered. Viking Farm Machinery, Ltd. has its one model diesel. Perkins, Armstrong Siddeley and diesels of the same make as the combine in the cases of the German units were noted. The tremendous sweep of the Deere self-propelled automatic hillside combine in the U.S. with its German Lanz diesel combines in the European picture augers that the U.S. will soon see more diesel combines.

"SOMEBODY is going to build the new equipment that will develop around the research of Agricultural engineers, chemists, plant breeders, soil specialists and farm managers," declared President Roy Bainer of the U of California. Ag. Engineering division. Air conditioning for live stock in hot climates will add pounds of pork, beef, milk, wool and eggs, the researchers find. That opens up a place for installations with diesel-electric power.

A Cummins diesel engine with Allison Torqmatic transmission (which provides torque converter, planetary range gearing and transfer gear drop box) powers the Chaseside Oremover that is being introduced into Canada this year from England, according to General Manager Berryman of Chaseside Equipment Company of Canada, Burlington, Ontario, Canada.

U.S. tractor shipments continue to show an upward trend as the belated spring, floods that broke the southwest droughts, rising labor costs and expanding road building combine to lift demands for more and bigger tractors with more diesels for their economy. Tractor manufacturers with complete lines increased shipments 25% over February for March this year and 31% over March, 1956.

Engineering Vice-President

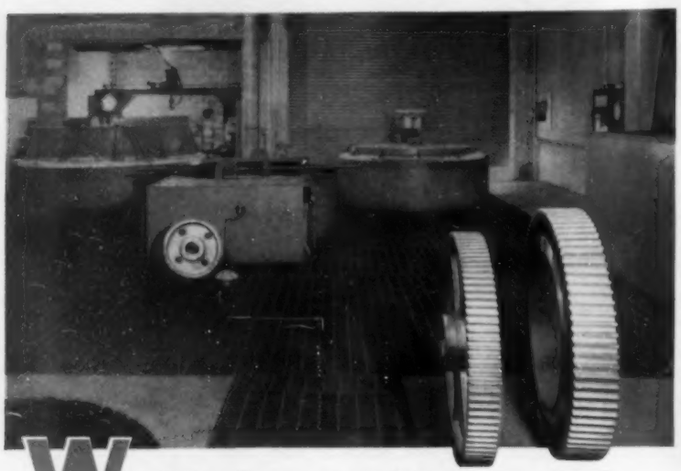
Dr. F. W. Lohmann has been appointed Vice President in charge of engineering and research of Diesel Energy Corporation, 82 Beaver Street, New York City, it was announced recently. The New York concern is the sole United States representative of Kloeckner-Humboldt-Deutz AG. of Cologne, West Germany. It imports, services, and distributes Deutz diesel engines. Dr. Lohmann holds several academic degrees in engineering. He headed the Generator Division of Kloeckner - Humboldt - Deutz AG. in Cologne before coming to the United States.

Cummins Sales and Service Expansion

Cummins Sales and Service, Inc., facilities in the Mid-Continent area have been extended further with the recent opening of a new shop and office at Biloxi, Mississippi. The installation, designed to serve truckers, boat operators, and other diesel engine users, provides sales and planning assistance, shop and field service, and ready availability of genuine Cummins diesel parts. The new Biloxi diesel shop is located to serve truckers and boat operators to the best possible advantage. The shop faces busy trans-continental U. S. Highway 90, and a pier leads to the back of the shop from an adjacent boat slip which opens into the Gulf of Mexico.

The facility is the fifteenth in the network of complete Cummins Sales and Service, Inc., installations serving Texas, Oklahoma, Kansas, Louisiana, and Mississippi. Additional special oil field service points serve New Mexico at Farmington and Hobbs. Cummins Sales and Service, Inc., also announced plans for a new diesel shop and office at Wichita, Kansas, to replace existing facilities there. The expansions are part of the company's efforts to assure owners of Cummins diesel and Turbodiesel engines that their engines will never be far from proper maintenance facilities and genuine Cummins engineered parts.

Complete Cummins Sales and Service, Inc., facilities now are available in Texas at Abilene, Amarillo, Dallas, Fort Worth, Houston, Odessa, Palacios, Pharr, San Antonio, and Wichita Falls; in Oklahoma at Oklahoma City; in Louisiana at New Orleans and Shreveport; in Mississippi at Biloxi, and in Kansas at Wichita.



World's largest Radiant Tube Pit-type Carburizer installed at BRAD FOOTE

...more precise heat treatment for larger gears

- New heat-treating equipment, including the largest radiant tube pit-type gas carburizing furnace ever built, has recently been installed in the Pittsburgh plant of our subsidiary, Pittsburgh Gear Company. These new additions to BRAD FOOTE's extensive heat-treating equipment provide facilities for the most advanced techniques in deep case carburizing and hardening in controlled atmospheres.
- The new carburizer can handle gears or machine parts up to 6 feet long, 6 feet wide and up to 8500 pounds in weight. In addition to its size, the new equipment has an unusual ability to control carbon penetration, giving extremely precise control of the depth of surface hardening.
- Special heat-treating equipment, like this new carburizer, allows BRAD FOOTE to impart the precise metallurgical characteristics which make for longer wear, shock resistance and freedom from distortion in gears of all sizes and types. And BRAD FOOTE heat-treating is under the supervision of metallurgists with long experience in the special problems of the gear industry.
- Whether you want one gear or ten thousand, BRAD FOOTE's extensive facilities and specialized skills are at your disposal. Send us the specification on your next problem job for quotation. No obligation, of course.

BRAD FOOTE MAKES
Spur • Bevel
Helical • Spiral Bevel
Herringbone
Zerol • Worms
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Transmissions

BRAD FOOTE GEAR WORKS, INC.
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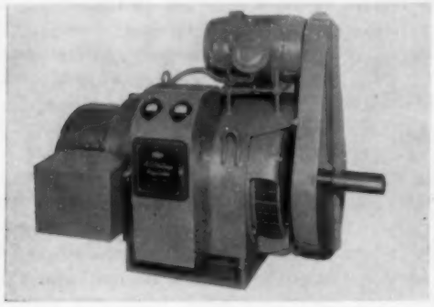
Bishop 2-1070 • Olympic 2-7700 • TWX: CIC-2856-U

subsidiaries
AMERICAN GEAR & MFG. CO. Phone: Lemont 920 Lemont, Illinois
PITTSBURGH GEAR COMPANY Phone: SPalding 1-4600 Pittsburgh 23, Pennsylvania

Generator For Offshore Drilling Work

The electric power requirements aboard offshore drilling rigs are unique. Since a fire or explosion aboard a rig would be disastrous, maximum efforts are made to reduce fire hazards. Explosion-proof



electrical equipment would be desirable for offshore rigs. However, explosion-proof equipment is not available and its cost, if available, would be prohibitive. Electric Machinery Manufacturing Company has developed a generator for offshore use with two important new features, yet the machine is of standard drip-proof construction. The machine is offered with a top mounted belted exciter. This exciter is an explosion-proof unit and is electrically connected to the generator with explosion-proof fittings. The primary spark producing part of the generator is thus explosion-proof and isolated.

The collector rings of this machine are enclosed in a heavy cast steel enclosure. The enclosure is complete. Any collector ring arcing is confined to the enclosure. The secondary source of sparking, is thus isolated. The enclosed collector ring housing has one other advantage. Sea air is very corrosive, particularly on brass and copper parts. Enclosing the collector rings, which are brass, limits the corrosive effect of sea air. Consequently, life of collector rings comes closer to the life expected of rings in a normal atmosphere. The total effect of enclosing the exciter and the collector rings is to make this generator suitable for offshore use. The machine has found use on the offshore drilling rigs both as primary sources of power and as power sources for auxiliary systems. An example of the latter is mud reclaiming. This type of construction satisfies a drilling rig's demand for special Electrical Equipment, yet does it without wasting space and at a realistic first cost.

Cooper-Bessemer International President

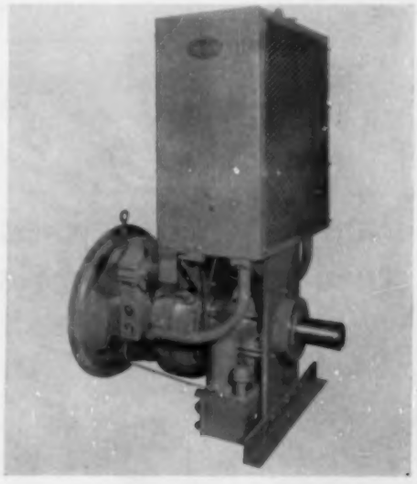
Charles G. Cooper

The election of Charles G. Cooper to President of Cooper-Bessemer International is announced by Lawrence F. Williams, Chairman of The Board of The Cooper-Bessemer Corporation, Mount Vernon, Ohio. In addition to his new capacity as President of The Cooper-Bessemer International, Mr. Cooper is also President of Cooper-Bessemer Overseas Corporation and Cooper-Bessemer of Canada, Ltd., Mr. Williams points out. Mr. Cooper succeeds Michael C. Pollock, who has headed these three corporations for several years and who is now retiring from active service. Prior to his election to president of The Cooper-Bessemer International, Mr. Cooper had been vice president of the three Cooper-Bessemer subsidiaries. For many years he was manager of Cooper-Bessemer's Washington office where he was responsible for direct relations between Cooper-Bessemer and agencies of the U.S. Government as well as direct contact with owners and operators of engines and compressors for pipelines and petroleum processing plants.

Higher Capacity Torque Converter

Production of a new, higher capacity version of the Twin Disc 11,500 Series Three-Stage torque converter has been announced by Twin Disc Clutch Company's Hydraulic Division, at Rockford, Illinois. Designated the Heavy-Duty 11,500 Series Three-Stage torque converter, the new unit has a maximum rating of 586 hp at 2200 rpm. Impellers are available for specific torque ratings of 340, 390, 450 and 540 lb-ft. Maximum input torque is 1400 lb-ft. Current production units include the Model CF, which provides a clutch at the flywheel, and the Model F, which is connected to the flywheel with a driving ring. Both types are designed for SAE No. 0 flywheel housings.

A Twin Disc C-3 Rear End, with the output shaft supported by two heavy-duty roller bearings, is available with either model, permitting maximum sidepull to be taken from the torque converter. Available as optional equipment is a radiator integrally supported as a part of the converter. With the addition of the Heavy-Duty 11,500 Series torque converter, Twin Disc now offers three-stage units for engines rated from 40 to 1000 hp and from 700 to 2400 rpm. Twin Disc Single-Stage torque converters are currently available for en-



gines rated at 30 to 212 hp and at 1100 to 3200 rpm. For further information concerning Twin Disc Torque Converters and Fluid Drives, write Twin Disc Clutch Company, Hydraulic Division, Rockford, Illinois.

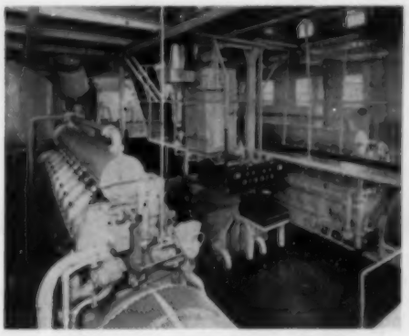
MARK EASTIN

HAS TWO BRIGGS CD LUBE OIL CLARIFIERS FOR ITS 2-2800 BHP 16 CYLINDER DIESELS.

THERE'S A REASON!

SEE FOR YOURSELF. WRITE FOR COMPLETE MARINE DATA AND NEW FILTER/SEPARATOR MANUAL.

USE THE COUPON BELOW



Engine room, The "Mark Eastin," showing Briggs CD units installed.

Briggs
PIONEERS IN MODERN OIL FILTRATION
OIL FILTERS
FILTER/SEPARATORS
PRODUCTS OF BOWSER RESEARCH

THE BRIGGS FILTRATION COMPANY
DEPT. 181, WASHINGTON 16, D.C.

YES

Send me marine data and filter/separator manual.

WATER AND ABRASIVES REMOVAL FROM FUEL OIL OF SEA GOING VESSELS

Name.....

Company.....

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New Orleans Notes

By Herb Lopez

The following sales have recently been completed by the George Engine Company of Harvey, La.

D & M Towing Company, Cut Off, Louisiana, have purchased two 62206 GM diesel engines to repower their *M/V Dog*, a tugboat.

TWO 40 ft T/S crewboats, *Vernon G.*, and *Robert Y.*, of Houston, Texas, powered with GM diesel engines, Model 6071A, were delivered to Brewster-Bartle Drilling Co., Houston.

PERFORACIONES Delta C. A. of Caracas, Venezuela, received three 40 ft T/S crewboats which were built by Gulf Master Boats of Slidell, Louisiana, and powered by GM diesel engines, Model 6071A.

DELIVERY of two GM diesel engines, Model 6122T to Scariano Boat Works was made to power one of the crewboats under construction.

THREE T/S 40 ft Sewart crewboats were delivered to W. R. Alger & Co., forwarding agent for delivery to C. A. Maracaibo, Maracaibo, Venezuela. These vessels are powered by GM diesel engines, Model 6071A

AN ACK-40 diesel generator set, powered by GM diesel engines Model 4061A were delivered to Berard Bros. Towing Co., New Iberia, La.

MAYBON Corp, Harvey, La., has taken delivery on a DCK-20 generator set powered by a GM diesel, Model 2061A.

TO REPOWER one of his crewboats, Louis A. Mistich of Buras, La., has purchased two 3071C GM diesels.

FOR ONE of their jobs, Mobile Ship Repair, Inc., Mobile, Ala., has bought two 62206 GM diesels.

A 35 ft T/S Roy Breaux Cruiser powered by two 4120T GM diesel engines was delivered to Sheldon J. Adams, Kaplan, La.

FOR THE *Barry N.*, Warren J. Nunez purchased a 3045C GM industrial diesel unit.

HARRY Collins, d/b/a Collins Towing Co., Harvey, La., has purchased the *Jim Collins*, a 55 ft Bryant tug, powered by two 62206 GM diesels.

FOR THEIR derrick barge IV, J. Ray McDermott & Co., Harvey, La., purchased a 2031 GM diesel industrial unit.

SPL #1, 26 ft Star Marine Cruiser, powered by a 4071C GM diesel engine, was purchased by Service Pipe Line Co., Tulsa, Okla.

NOW IN operation for Ferdie A. Frey, Hackberry, La., is the *Lois Marie*, a 32 ft S/S Roy Breaux cruiser. It is powered by a GM 6071A diesel.

Alco House Organ

A modern heat-transfer fluid-flow laboratory and the Army Package Power Reactor at Fort Belvoir, Va. are featured in articles in the Spring, 1957 issue of the *Alco Products Review*. The latest issue of the 26-page quarterly publication of Alco Products, Inc. also contains articles on a new unit of a power station at Muskegon, Michigan, and a petrochemical processing plant at Grangemouth, England. The Army Package Power Reacter, a 2,035 kw pressurized-water nuclear power plant built by Alco for the U. S. Army under contract to the Atomic Energy Commission, is the subject of two sections of the *Review*. One deals with nuclear wastes from small power reactors such as the APPR, and the other is a two-page description of the plant itself.

The APPR is operating and is scheduled for formal dedication April 29. The heat-transfer laboratory is described in a seven-page article written by the engineer in charge of the operation. This laboratory differs from other research centers of its type because it studies and tests full-size units rather than working models. Alco is using it to improve its present heat transfer equipment and develop new products in that line. Copies of the *Alco Products Review* are available from Alco Products, Inc., P. O. Box 1065, Schenectady, New York.

Slide Film and Film Booklet

Another new, slide-sound, color film kit *Regulation and the Charging Circuit* was added to the Delco-Remy film library. It consists of a 35 mm color film, a 12 in. record, and a leader's guide containing suggested meeting procedures. *Regulation and the Charging Circuit* shows with simplified illustrations the internal construction and operation of a battery, generator and regulator and explains in non-technical terms how these units work together as a team to make up the charging circuit in the modern vehicle. Running time 12 minutes. To accompany the film kit is a 16-page booklet in color (6 in. x 9 in. in size) containing the same illustrations shown in the film. It may be used to review the film after it is shown. The new film kit (DR-9015K) and film booklet (DR-9015) have been designed for use by students of Auto Mechanics, shop mechanics, or civic groups who wish to learn in simple non-technical terms the basic function of the electrical units making up the charging circuit. The film kit may be borrowed and returned after each showing or may be purchased. The film booklets are available in limited quantities without charge. Requests for the film or film booklets should be addressed to: Technical Editor, Delco-Remy Div., G.M.C., Anderson, Indiana.

An engine is as good as the foundation on which it is installed—no better! It is no better than the poorest piece of auxiliary equipment on which it is dependent for dependable operation.

1,000 hp units operate at full load in world's hottest location

Not even the fierce heat of Kuwait or general water shortage in the area can impair the efficiency of the Young equipment used to cool the jacket water, supercharger intercooler water and engine oil on the engines of the four 1,000 hp pumping units designed and built by the Enterprise Division of General Metals Corporation of San Francisco.

Young equipment identified above: (1) Radiator Model MWC-455 with separate cooling sections for jacket water-supercharger intercooler water and engine oil. (2) Young Mono Weld ® construction turbo-charged air intercooler. (3) Model OCS-300 Torque Converter Cooler.

"WHERE QUALITY COUNTS"

Let Young Radiator solve your heat transfer problem. Write today to Dept. 407-G for catalog 1356. There is no obligation.

Young RADIATOR COMPANY
RACINE, WISCONSIN
Creative HEAT TRANSFER ENGINEERS
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

Corrosion Removal Compound

Oakite Drycid, a new powdered acid material which removes rust, scale and corrosion with greater safety to metal surfaces as well as personnel, has recently been introduced by Oakite Products, Inc., manufacturers of industrial cleaning and metal treating materials. Added to water in concentrations upwards of eight ounces to the gallon, Oakite Drycid is said to go into solution fast and to be useful in applications by circulation or immersion. Solutions of the compound may be used cold or for faster action, heated to 165°F. It is said to be effective in the removal of scale, scale-like deposits, rust, iron sulphides and other oxides.

Major advantages outlined by Oakite engineers of this new material include its ease in shipment and in storage, as it requires no returnable carboys but is shipped in fiber drums; its mild, aromatic odor and non-fuming characteristic; its greater safety on aluminum, brass and galvanized surfaces, when used as recommended. Further information on this new powdered acid compound is available from Oakite Products, Inc., 157, Rector Street, New York 6, N.Y.

ITS NEW

New Sales Office

The opening of a new Sales Office of the Cleveland Diesel Engine Division of General Motors in New Orleans, La., was announced recently by Thomas E. Hughes, Cleveland Diesel General Manager. The office will be located at 727 Baronne St., New Orleans. Mr. Hughes said that greater sales representation in the Gulf area was necessary because of the favorable acceptance of the Cleveland Diesel Model 498 turbocharged 2-cycle Diesel engine. At the same time, Hughes named Joseph Elliott as marine sales representative to the New Orleans post. Elliott was born in Fordyce, Arkansas, and joined Cleveland Diesel in 1941 as a cooperative student at General Motors Institute, Flint, Michigan. Elliott graduated from GMI in 1945 and, after holding several positions at Cleveland Diesel, joined the Sales Department in 1947 as Junior Sales Engineer. In 1952 he was designated Marine Sales Representative at Cleveland, and was transferred to St. Louis in April 1954. He has been at St. Louis until his transfer to New Orleans.

Filter Division Manager

Mr. Carlton H. Winslow, Vice President of The Cuno Engineering Corporation of Meriden, Conn., has announced the appointment of Mr. Walter J. Holder as Manager of the Micro-Klean Filter Division with headquarters in Meriden. Mr. Holder brings to Cuno experience in this field after five years with the Indiana Commercial Filters Corporation and Honan-Crane Corporation of Lebanon, Indiana. His most recent position was Sales Manager. Prior to this, he was associated with the machine tool industry.

In addition to this background and experience in sales and industrial engineering, Mr. Holder attended Niagara University and The University of Buffalo, receiving his Bachelor of Science Degree from the latter. He is a member of the American Society of Tool Engineers, and the American Society of Lubrication Engineers. Mr. Holder has already commenced his duties with Cuno, and resides in Wallingford, Conn.

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG,** Volume 22. This giant, 400 page, 10½" x 13½", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS,** 816 N. La Cienega Blvd., Los Angeles 46, Calif.

NAPIER

SETS CRACKERJACK CLIP ON LAKE MARACAIBO!

All-weather craft speed oil workers to drillings

Employees of the Compañía Shell de Venezuela are now transported 25 miles to offshore drilling platforms in large, Napier Deltic-powered crew boats which get there 50% quicker than the fastest vessels now in service. This is a big advance on existing slow surface transportation or helicopters with small payload and high operating and maintenance cost. Power for the boats comes from two 9-cylinder opposed piston diesels. These Deltics with their "triangle" of cylinders ensure an amazing balance and freedom from vibration even with 1,620 h.p. in the engine room.

Fast, reliable, all-weather movement of men and materials has become a must for all offshore oil operations if they are to run on an economic round-the-clock basis. Napier Deltics provide twin-engined reliability and drive the fully-loaded, 50-passenger Shell Boats at an easy and safe 35 m.p.h. under continuous cruise conditions.

Plans of Napier Deltic-powered crew boats specially designed for Gulf operation are available. For more information on the Deltic diesel contact the Napier Representative—L. O. Brooks, 909 Dupont Circle Building, Washington 6, D.C. Phone North 7-0146.

NAPIER DELTIC MARINE DIESEL

A new conception of Marine Power

D. NAPIER AND SON LIMITED • LONDON • W.3 • ENGLAND • Partners in Progress with The ENGLISH ELECTRIC Company Ltd.

CRC D37

Diesel Shipbuilding Delivers *Pecalin*

The tug *Pecalin*, built by Diesel Shipbuilding Co. of Atlantic Beach, Florida, for the St. Petersburg Towing & Marine Co. of St. Petersburg, Florida, was put through a regular shakedown cruise on the Intracoastal Waterway and the Atlantic Ocean recently, after which the craft proceeded down the Florida East coast and finally up the West coast to the city of Tampa where it was put into service in Tampa Bay and adjacent waters.

The *Pecalin* is 46 ft 7 in. long with a beam of 15 ft and a 6 ft draft. Propulsion is furnished by a General Motors 6-110 diesel engine which develops a continuous horsepower of 220 at 1800 rpm turning a four blade Federal propeller through General Motors 3 to 1 reverse reduction gears. It has a front end power take-off for the Jabsco bilge pump, plus keel cooling. Fuel capacity is 4,600 gals. plus a fresh water capacity of 1,000 gals.

Small Precision Borer

Designed for special installations where space is limited, a new, low-cost precision borer has been announced by Greenlee Bros. & Co., Rockford, Illinois. It is the new Hydro-Borer, Model S-6.

The S-6 is small and compact. It weighs only 75 lbs and is designed for easy mounting on workholding fixtures or assembly jigs. Overall dimensions are 29½ in. x 6¾ in. x 3¾ in. A unique patented feed principle, positive feed by oil displacement, is used on the Greenlee Hydro-Borer. A piston, with a modified square thread, is mounted on the spindle and rotates within an oil-filled cylinder. This rotation causes oil to be displaced from the front to the rear of the cylinder and feeds the spindle at a constant rate. Rate of feed is determined by the lead and pitch of the thread and is variable in two ranges: from .002 in. to .004 in. and from .0035 in. to .007 in.

The spindle diameter is 1¼ in. with a #2 Morse Taper. The taper can be supplied either concentric or eccentric. Eccentric taper permits increasing bore diameter a total of .014 in. increments of .001 without resetting the tool bit. The S-6 is capable of boring within a tolerance of .0003" and producing a finish of 30 micro-inches or better. According to the manufacturer, the S-6 Hydro-Borer assures low maintenance costs due to its simple construction. The machine consists of a cylinder housing and oil reservoir, two meehanite bearings, boring spindle assembly, control valve and spindle drive assembly. This rugged, simple construction offers precision boring at a low initial investment. For further information about the new S-6 Hydro-Borer, or other Greenlee boring machines, inquiries may be addressed to Greenlee Bros. & Co.., Rockford, Illinois.

America's Largest GM fuel injector rebuilder

Interstate

diesel service incorporated

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Products sold exclusively through dealer and distributor organizations throughout the United States and Canada. Dealer inquiries welcome

MODERN SLOW SPEED

DIESEL ELECTRIC GENERATOR SETS

• 600 RPM—Worthington BB5
100kw 3/60/480

• 300 RPM—Fairbanks Morse 33F16
1125kw 3/60/480

Complete With All Auxiliaries

Other Sets From 20kw to 1200kw

DIESEL DIVISION

National Metal & Steel Corp.

TERMINAL ISLAND (Los Angeles Harbor), CALIF.

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A Channelcromed Diesel Engine Liner

Two thousand and fifteen Diesel locomotive engine liners have been Channelcromed for a transcontinental American railroad, without even one liner failure as by scuffing, scoring, peeling, or by excessive wear, establishing a "new low for the rate of wear and all-time low for the rate of lubricating oil consumption."

Ask for Bulletin 74 on Diesel liners and Bulletin 76 on Channelcromed air brake compressor cylinders.

PENNINGTON CHANNELCROMIUM COMPANY

319 Dakota St., San Antonio 3, Texas

Grinding and Hard-Chrome Plating of Diesel Engine Crankshafts

ALL SIZES

Complete facilities for grinding, plating, Magnafluxing, and electrically-controlled heat-treating. Largest hard-chrome plating plant in the Mid-Continent area. Experience • Quality • Precision

LANE PLATING WORKS
5322 BONNIE VIEW RD.
DALLAS, TEXAS

Vice President of Engineering

Ralph L. Boyer

The election of Ralph L. Boyer to Vice President and Director of Engineering by the company's Board of Directors has been announced by L. F. Williams, Board Chairman. Mr. Boyer's election fills the position left open by the retirement of Hewitt A. Gehres from active service with the company. Mr. Boyer is well-known throughout the engine and compressor building industry for the development of Cooper-Bessemer's gas-diesel and the high compression spark-ignited gas engine. Mr. Boyer graduated from Ohio State University in 1924. While an undergraduate, and 2 years after graduation, worked with Dr. Elmer Sperry in the pioneer development of the compound diesel engine.

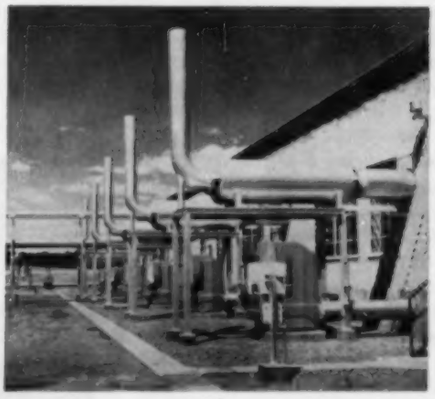
In 1926 he joined The Cooper-Bessemer Corporation as Diesel Engineer; was made Assistant Chief Engineer in 1929 and Chief Engineer in 1938. In 1947 Mr. Boyer was elected Vice President and Chief Engineer, and in 1950, a director of the company. In 1950, on behalf of the American Society of Mechanical Engineers he presented a paper of American progress in engine development before the World Power Conference. Mr. Boyer was recently awarded, for 1951, the Lamme Medal, one of Ohio State University's highest honors for his prominent development work in diesel and gaseous fueled engines.

Unique Yacht

The *Mary Frances II* a 52 foot modified shrimp trawler hull yacht, was constructed at the Tileakos Boat Building Co. in Fernandina, Florida for Stuart Butler of Ponte Vedra. The vessel has the basic design and ruggedness of a regular trawler, the keel is 6 in. x 8 in. yellow pine; the ribs are of oak 2 in. x 4 in. steam bent with 1⅝ cypress planking. The modified trawler hull yacht sleeps five, has a roomy and luxurious salon with wall to wall carpeting and is completely air conditioned.

The *Mary Frances II* is powered by a model HRM 600 Cummins diesel which has a horsepower rating of 165 at 1800 rpm. The diesel drives a 30 in. x 24 in. four blade Columbia propeller through a 1.96:1 Twin Disc reduction gear. The compactness of the Cummins diesel engine allowed the designer and builder to install more power into a smaller engine room thereby permitting greater utilization of below deck space for living quarters. A 3 kw Onan diesel generating set was installed to allow the installation of many extras for pleasure yachting.

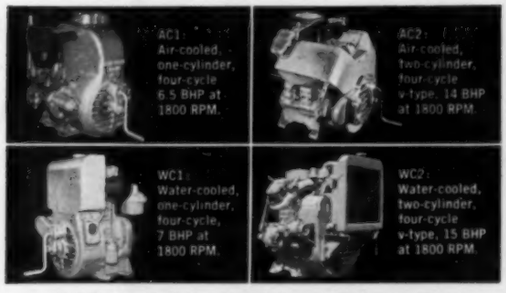
Silencers For Pipeline



The thirteen stations of the Pacific Northwest Pipe Line, running from New Mexico to Washington, are equipped with new turbo-supercharged type engine compressors. Each of these engines in turn, is equipped with a new design of exhaust snubbers, specifically developed by Burgess-Manning Company for this service and used for silencing all engines powering this pipe line. The new Burgess-Manning Snubbers are of a straight-thru type with a very low pressure drop, particularly suitable for silencing the new type turbo-supercharged engine used on this line.

THE BIG 4 IN DIESEL POWER

AMERICAN MARC Inc. dominates the field of lightweight, low-horsepower Diesels by building its diversified line from the "Big Four" basic models illustrated here. Purchase and maintenance of engines and parts are simplified by the use of these compact and rugged prime movers.


AC1: Air-cooled, one-cylinder, four-cycle 6.5 BHP at 1800 RPM.
AC2: Air-cooled, two-cylinder, four-cycle v-type, 14 BHP at 1800 RPM.
WC1: Water-cooled, one-cylinder, four-cycle, 7 BHP at 1800 RPM.
WC2: Water-cooled, two-cylinder, four-cycle v-type, 15 BHP at 1800 RPM.

AMERICAN MARC also manufactures Diesel generating plants from 3 to 10 KW (AC or DC, and industrial three-phase), Diesel pumping units from 4 to 1700 GPM, marine propulsion, refrigeration units and power-packages for other services. American MARC can adapt any of its Big 4 engines to fit every job requiring from 5 to 20 BHP.

SOME DESIRABLE SALES TERRITORIES ARE STILL OPEN.
INQUIRIES ARE INVITED FROM REPRESENTATIVE DEALERS.

AMERICAN MARC INC.
DIESEL ENGINES
1601 West Florence Ave. Telephone OR 8-7174
Dept. D-77 Inglewood, Calif.
AMERICA'S LARGEST MANUFACTURER OF AIR-COOLED DIESELS

Specify
W·G·B·
...THE ORIGINAL
OIL CLAR-O-FIER
that CLEANS oil and KEEPS it CLEAN
W-G-B
Available for all types of oil filtration... from 60 to 750 cu. in. capacity
WRITE FOR COMPLETE DETAILS AND NAME OF NEAREST DISTRIBUTOR
W·G·B· OIL CLARIFIER, INC.
KINGSTON • NEW YORK

Appoints New Representatives

Harold A. Weidenman, President of Kittell Muffler and Engineering, Inc., Los Angeles, California, today announced the appointment of three new representatives for the Kittell line of industrial, marine and mobile silencers and spark arrestors. 1. Mr. E. C. Schum, Schum Engineering Sales Company, 723 Dayton Street, Hamilton, Ohio; Territory of the States of Indiana, Ohio and Kentucky. 2. Mr. F. O. Walsh, Jr., 401 Volunteer Building, Atlanta, Georgia; Territory of the States of Tennessee, North Carolina, South Carolina, Alabama, Georgia, and Florida. 3. Mr. Thomas E. Neal, 2804 N. Meade Avenue, Chicago, Illinois; Territory includes the States of Illinois and Michigan.

Gasket Cutter Bulletin

A new bulletin describing their latest gasket cutter has just been published by The Garlock Packing Company of Palmyra, New York. The versatile tool, used for cutting round gaskets from asbestos, rubber, fibre or cork sheets can also be used for precision scribing and layout work. The Garlock gasket cutter, known as the "B" set, is a finely made tool featuring a hexagonal-shaped bar providing a six-sided face on which to mount the knife and point holders. This bar assures a smooth, positive gripping surface for the holders. The tool is adjustable to cut gaskets 1-1/4 in. to 22-1/4 in. outside diameters. Center point and knife holders can be mounted on a bar for cutting larger gaskets. Samples of four widely used sheet packings are included with the cutter sets. For further information on the Garlock gasket cutter, write for Bulletin 140 to The Garlock Packing Company, 409 Main Street, Palmyra, New York.

Export Locomotive Orders

Alco Products, Inc. has announced the receipt of two of the largest fleet orders for export diesel locomotives ever placed with this locomotive builder. Coupled with a third order for export delivery, the new bookings total 248 units and amount to $56 million. They are for two models of the company's special export line of diesel-electric locomotives. Included in the orders are 130 road-switcher units for the Argentine State Railways, 100 of Alco's *World* locomotives for the Railway Board of India, and 18 additional *World* units for the North Western Railway of Pakistan, which has been operating this type of diesel since last year. This will bring the number of Alco units in Pakistan to 69.

The DL-500 *World* locomotive was introduced in 1953 and demonstrated in Spain in 1955. It is an 1800-hp streamlined unit designed exclusively for overseas service. The locomotive is powered by Alco's new 12-cylinder, turbocharged, Model 251 diesel engine, and is designed to operate on any railroad in the world. Providing light axle loading, the *World* unit meets the requirements of international clearances, and with only a change in trucks it can operate on any gauge track from the one meter found in many countries to the five-ft, six-in. gauge, widest in the world, used in India, Pakistan, Spain and Argentina. The locomotive, designed for either high-speed passenger or freight service, is now in service in Spain, Pakistan, Peru and Australia.

The road switchers on order for the Argentine State Railways are Alco's Model DL-540, an export version of the 1800-hp unit introduced to the domestic railroads in 1956. These units have a power plant, control equipment and components identical to those of the *World* locomotive, but are designed for heavy switching service as well as main-line operations. Alco also reported that, during the first quarter of this year, it

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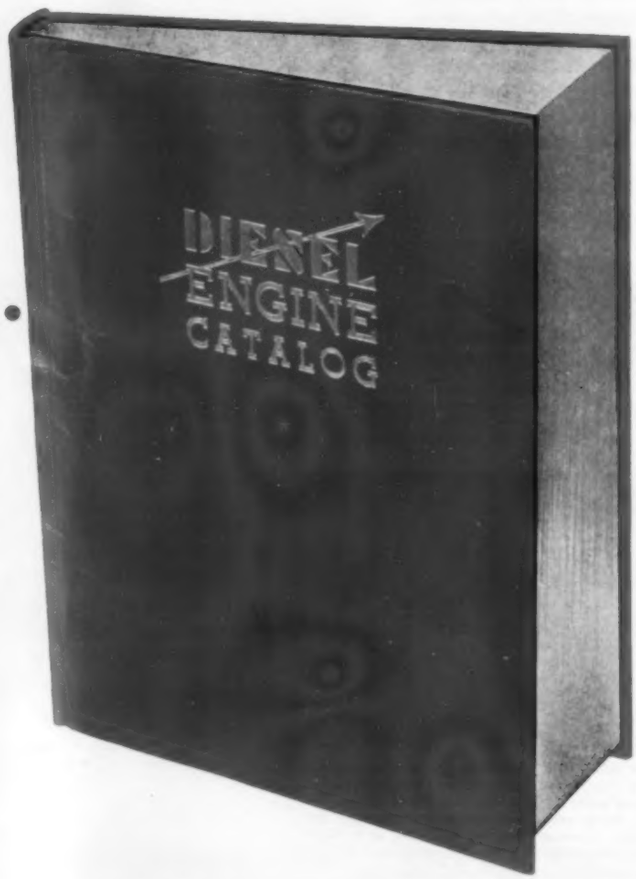

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has received orders "at a high rate" from the transportation, petroleum, chemical and public utility industries. In addition to railroad locomotives, these orders cover drilling power packages for the petroleum production industry and heat exchangers, feed-water heaters and other thermal equipment for chemical and power installations. The company said that its backlog of orders for regular products totaled $110 million on May 1. This, Alco added, was more than double the amount of unfilled orders at the end of 1956 and represents the highest backlog for commercial products in many years. A spokesman stated that this business, coupled with a three-year labor agreement just concluded at Alco's plants in Schenectady, Auburn and Dunkirk, assures the company of an uninterrupted period of planning and operations.

Branch Manager

The promotion of Frank J. Hunter to Branch Manager of the St. Louis office is announced by Robert F. Lay, Vice President and General Sales Manager of The Cooper-Bessemer Corporation. The appointment of Mr. Hunter fills the position left by W. S. (Bill) Arthur who has retired from the company. In this position as Branch Manager, Mr. Hunter will be responsible for all sales and service activities of the company in both the St. Louis and Kansas City areas, Mr. Lay points out. This will include continued close personal contact with workers and operators of engine and compressor equipment in the Kansas City district. In addition will be new responsibilities for the complete direction of sales and service of diesel, gas and gas-diesel engines for marine propulsion and electric power generation.

A graduate of Iowa State College in 1944, Mr. Hunter holds a Mechanical Engineering degree. Upon graduation he joined another engine building firm where he held the position of Sales Engineer. He joined Cooper-Bessemer in 1955 and until recently was the Cooper-Bessemer sales representative in Kansas City, Missouri.

District Manager

Charles L. Hoebel has been appointed district manager of the New York office of Elliott Company. A graduate in mechanical engineering from Worchester Polytechnic Institute, Mr. Hoebel joined the Elliott Company New York office as a field engineer in 1952. During World War II, he served with the Navy department and as a lieutenant in the Navy.

Fairbanks-Morse Assignments

Robert H. Morse, Jr., President of Fairbanks, Morse & Co., has announced reassignment of three Vice Presidents and one plant manager and the promotion of four other executives. Reassigned are: Robert H. Morse, III, from Vice President in charge of sales to Vice President in charge of budgets and planning; V. H. Peterson, from Vice President in charge of engineering to Vice President in charge of sales; John A. Cuneo, from Vice President and Assistant to the President to Vice President in charge of foreign operations. Mr. Cuneo will be in charge of the company's Canadian and Mexican operations as well as its export division.

John C. Elmburg, Assistant General Sales Manager, was promoted to General Sales Manager, and G. R. Anderson, Sr., former Manager of the company's Kansas City (Kan.) Works, to Chief Engineer. C. E. Clausen, Manager of the St. Johnsbury (Vt.) Works, was named Manager of the Kansas City plant to succeed Anderson. H. M. Goodchild, Chief Engineer at St. Johnsbury, was promoted to Works Manager, and G. R. Anderson, Jr., named Chief Engineer at the Vermont plant.

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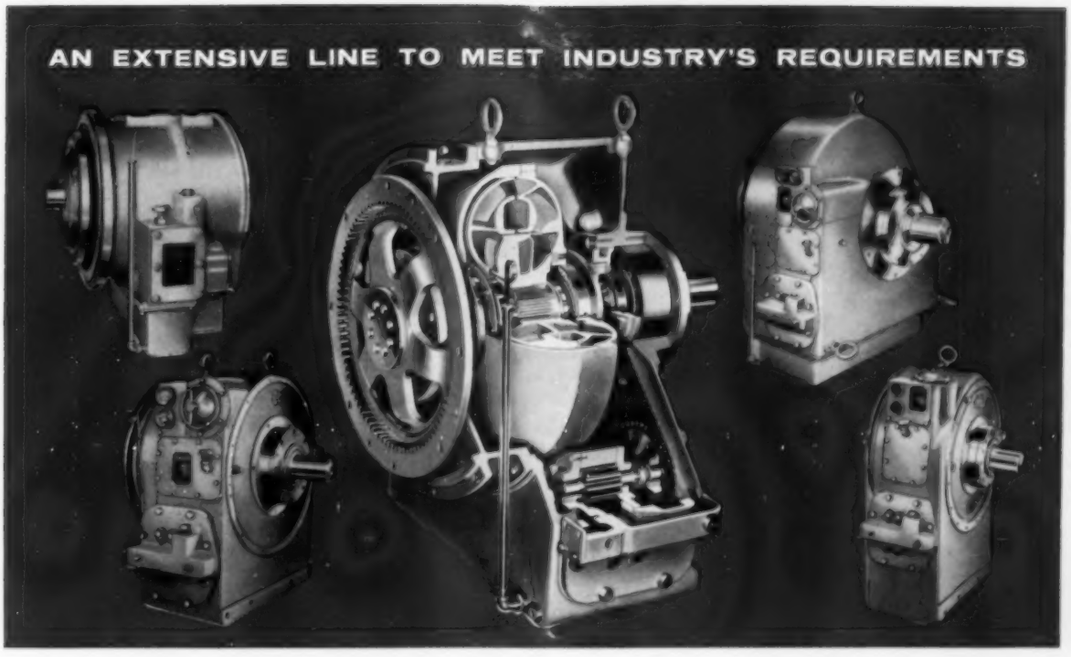

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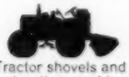
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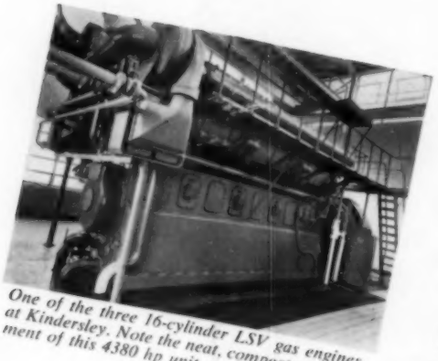

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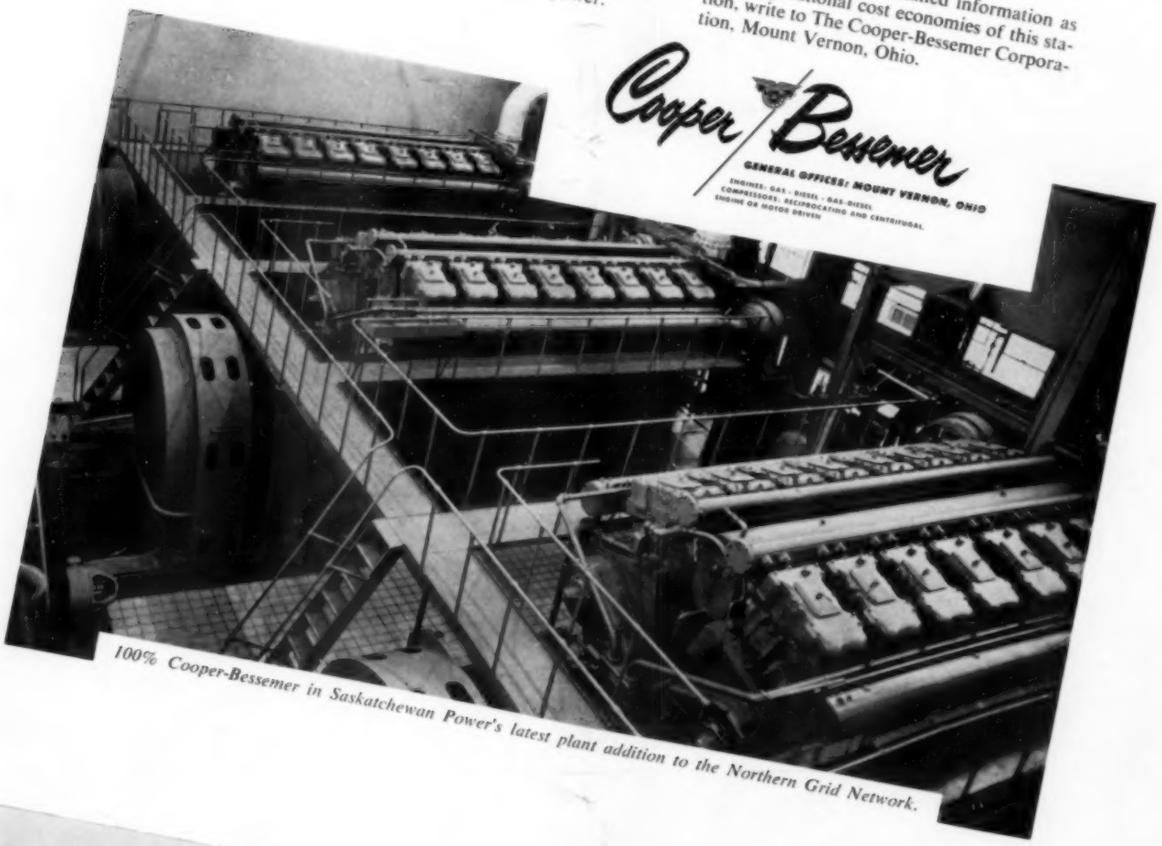

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